lenovo

# IdeaCentre B540–B540P
# Hardware Maintenance Manual

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# IdeaCentre B540–B540P
# Hardware Maintenance Manual

# Contents



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# Chapter 1. About this manual

This manual contains service and reference information for IdeaCentre B540 & B540P computers listed on the cover. It is intended only for trained servicers who are familiar with Lenovo computer products.

Before servicing a Lenovo product, be sure to read the Safety Information.

The description of the TV card in this manual is only used for the machines which have the TV card. It is invalid for those machines which do not have TV card.

## Important Safety Information

Be sure to read all caution and danger statements in this book before performing any of the instructions.

Veuillez lire toutes les consignes de type DANGER et ATTENTION du présent document avant d'exécuter les instructions.

Lesen Sie unbedingt alle Hinweise vom Typ "ACHTUNG" oder "VORSICHT" in dieser Dokumentation, bevor Sie irgendwelche Vorgänge durchführen

Leggere le istruzioni introdotte da ATTENZIONE e PERICOLO presenti nel manuale prima di eseguire una qualsiasi delle istruzioni

Certifique-se de ler todas as instruções de cuidado e perigo neste manual antes de executar qualquer uma das instruções

Es importante que lea todas las declaraciones de precaución y de peligro de este manual antes de seguir las instrucciones.

执行任何说明之前，请确保已阅读本书中的所有警告和危险声明。

執行任何指示前，請確實閱讀本書中的所有警告及危險聲明。

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# Chapter 2. Safety information

This chapter contains the safety information that you need to be familiar with before servicing a computer.

## General safety

Follow these rules to ensure general safety:

- Observe good housekeeping in the area of the machines during and after maintenance.
- When lifting any heavy object:
  1. Ensure you can stand safely without slipping.
  2. Distribute the weight of the object equally between your feet.
  3. Use a slow lifting force. Never move suddenly or twist when you attempt to lift.
  4. Lift by standing or by pushing up with your leg muscles; this action removes the strain from the muscles in your back.
     *Do not attempt to lift any objects that weigh more than 16 kg (35 lb) or objects that you think are too heavy for you.*
- Do not perform any action that causes hazards to the customer, or that makes the equipment unsafe.
- Before you start the machine, ensure that other service representatives and the customer's personnel are not in a hazardous position.
- Place removed covers and other parts in a safe place, away from all personnel, while you are servicing the machine.
- Keep your tool case away from walk areas so that other people will not trip over it.
- Do not wear loose clothing that can be trapped in the moving parts of a machine. Ensure that your sleeves are fastened or rolled up above your elbows. If your hair is long, fasten it.
- Insert the ends of your necktie or scarf inside clothing or fasten it with a nonconductive clip, approximately 8 centimeters (3 inches) from the end.
- Do not wear jewelry, chains, metal-frame eyeglasses, or metal fasteners for your clothing.
  **Remember:** Metal objects are good electrical conductors.
- Wear safety glasses when you are: hammering, drilling soldering, cutting wire, attaching springs, using solvents, or working in any other conditions that might be hazardous to your eyes.
- After service, reinstall all safety shields, guards, labels, and ground wires. Replace any safety device that is worn or defective.
- Reinstall all covers correctly before returning the machine to the customer.

## Electrical safety

**CAUTION:**
**Electrical current from power, telephone, and communication cables can be hazardous. To avoid personal injury or equipment damage, disconnect the attached power cords, telecommunication systems, networks, and modems before you open the computer covers, unless instructed otherwise in the installation and configuration procedures.**

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Observe the following rules when working on electrical equipment.

**Important:** Use only approved tools and test equipment. Some hand tools have handles covered with a soft material that does not insulate you when working with live electrical currents. Many customers have, near their equipment, rubber floor mats that contain small conductive fibers to decrease electrostatic discharges. Do not use this type of mat to protect yourself from electrical shock.

- Find the room emergency power-off (EPO) switch, disconnecting switch, or electrical outlet. If an electrical accident occurs, you can then operate the switch or unplug the power cord quickly.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Disconnect all power before:
  - Performing a mechanical inspection
  - Working near power supplies
  - Removing or installing Field Replaceable Units (FRUs)
- Before you start to work on the machine, unplug the power cord. If you cannot unplug it, ask the customer to power-off the wall box that supplies power to the machine and to lock the wall box in the off position.
- If you need to work on a machine that has exposed electrical circuits, observe the following precautions:
  - Ensure that another person, familiar with the power-off controls, is near you.
    **Remember:** Another person must be there to switch off the power, if necessary.
  - Use only one hand when working with powered-on electrical equipment; keep the other hand in your pocket or behind your back.
    **Remember:** There must be a complete circuit to cause electrical shock. By observing the above rule, you may prevent a current from passing through your body.
  - When using a tester, set the controls correctly and use the approved probe leads and accessories for that tester.
  - Stand on suitable rubber mats (obtained locally, if necessary) to insulate you from grounds such as metal floor strips and machine frames.

  Observe the special safety precautions when you work with very high voltages; these instructions are in the safety sections of maintenance information. Use extreme care when measuring high voltages.
- Regularly inspect and maintain your electrical hand tools for safe operational condition.
- Do not use worn or broken tools and testers.
- *Never assume* that power has been disconnected from a circuit. First, *check* that it has been powered-off.
- Always look carefully for possible hazards in your work area. Examples of these hazards are moist floors, nongrounded power extension cables, power surges, and missing safety grounds.
- Do not touch live electrical circuits with the reflective surface of a plastic dental mirror. The surface is conductive; such touching can cause personal injury and machine damage.
- Do not service the following parts with the power on when they are removed from their normal operating places in a machine:
  - Power supply units
  - Pumps
  - Blowers and fans
  - Motor generators

  and similar units. (This practice ensures correct grounding of the units.)
- If an electrical accident occurs:
  - Use caution; do not become a victim yourself.
  - Switch off power.

– Send another person to get medical aid.

## Safety inspection guide

The intent of this inspection guide is to assist you in identifying potentially unsafe conditions on these products. Each machine, as it was designed and built, had required safety items installed to protect users and service personnel from injury. This guide addresses only those items. However, good judgment should be used to identify potential safety hazards due to attachment of features or options not covered by this inspection guide.

If any unsafe conditions are present, you must determine how serious the apparent hazard could be and whether you can continue without first correcting the problem.

Consider these conditions and the safety hazards they present:

- Electrical hazards, especially primary power (primary voltage on the frame can cause serious or fatal electrical shock).
- Explosive hazards, such as a damaged CRT face or bulging capacitor
- Mechanical hazards, such as loose or missing hardware

The guide consists of a series of steps presented in a checklist. Begin the checks with the power off, and the power cord disconnected.

Checklist:

1. Check exterior covers for damage (loose, broken, or sharp edges).
2. Power-off the computer. Disconnect the power cord.
3. Check the power cord for:
   a. A third-wire ground connector in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and frame ground.
   b. The power cord should be the appropriate type as specified in the parts listings.
   c. Insulation must not be frayed or worn.
4. Remove the cover.
5. Check for any obvious alterations. Use good judgment as to the safety of any alterations.
6. Check inside the unit for any obvious unsafe conditions, such as metal filings, contamination, water or other liquids, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Check that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

## Handling electrostatic discharge-sensitive devices

Any computer part containing transistors or integrated circuits (ICs) should be considered sensitive to electrostatic discharge (ESD). ESD damage can occur when there is a difference in charge between objects. Protect against ESD damage by equalizing the charge so that the machine, the part, the work mat, and the person handling the part are all at the same charge.

**Notes:**

1. Use product-specific ESD procedures when they exceed the requirements noted here.
2. Make sure that the ESD protective devices you use have been certified (ISO 9000) as fully effective.

When handling ESD-sensitive parts:

- Keep the parts in protective packages until they are inserted into the product.

- Avoid contact with other people while handling the part.
- Wear a grounded wrist strap against your skin to eliminate static on your body.
- Prevent the part from touching your clothing. Most clothing is insulative and retains a charge even when you are wearing a wrist strap.
- Use the black side of a grounded work mat to provide a static-free work surface. The mat is especially useful when handling ESD-sensitive devices.
- Select a grounding system, such as those listed below, to provide protection that meets the specific service requirement.

  **Note:** The use of a grounding system is desirable but not required to protect against ESD damage.

  – Attach the ESD ground clip to any frame ground, ground braid, or green-wire ground.
  – Use an ESD common ground or reference point when working on a double-insulated or battery-operated system. You can use coax or connector-outside shells on these systems.
  – Use the round ground-prong of the ac plug on ac-operated computers.

## Grounding requirements

Electrical grounding of the computer is required for operator safety and correct system function. Proper grounding of the electrical outlet can be verified by a certified electrician.

## Safety notices

The caution and danger safety notices in this section are provided in the the language of English.



**DANGER**

Electrical current from power, telephone and communication cables is hazardous.

**To avoid a shock hazard:**

- **Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.**
- **Connect all power cords to a properly wired and grounded electrical outlet.**
- **Connect to properly wired outlets any equipment that will be attached to this product.**
- **When possible, use one hand only to connect or disconnect signal cables.**
- **Never turn on any equipment when there is evidence of fire, water, or structural damage.**
- **Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.**
- **Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.**

| To Connect | To Disconnect |
|---|---|
| 1. Turn everything OFF.<br>2. First, attach all cables to devices.<br>3. Attach signal cables to connectors.<br>4. Attach power cords to outlet.<br>5. Turn device ON. | 1. Turn everything OFF.<br>2. First, remove power cords from outlet.<br>3. Remove signal cables from connectors.<br>4. Remove all cables from devices. |

**CAUTION:**
**When replacing the lithium battery, use only Part Number 45C1566 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.**
***Do not:***

- **Throw or immerse into water**
- **Heat to more than 100°C (212°F)**
- **Repair or disassemble**

**Dispose of the battery as required by local ordinances or regulations.**

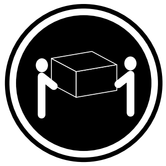
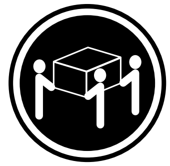
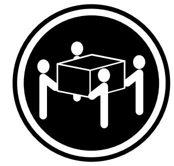
**CAUTION:**
**When laser products (such as CD-ROMs, DVD-ROM drives, fiber optic devices, or transmitters) are installed, note the following:**

- **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**
- **Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.**

**DANGER**

**Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following:**

**Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.**

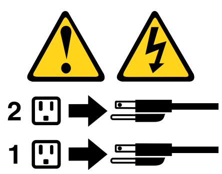
| | | |
|---|---|---|
|  |  |  |
| ≥18 kg(37 lbs) | ≥32 kg(70.5 lbs) | ≥55 kg(121.2 lbs) |

**CAUTION:**
**Use safe practices when lifting.**



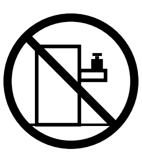
**CAUTION:**
**The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.**








**CAUTION:**
**Do not place any object weighing more than 82 kg (180 lbs.) on top of rack-mounted devices.**



# Chapter 3. General information

This chapter provides general information that applies to all machine types supported by this publication.

## Specifications

This section lists the physical specifications for your computer.

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**Type IdeaCentre B540 & B540P**

This section lists the physical specifications.

**Environment**

Air temperature:

- Operating: 10° to 35°C
- Transit: -20° to 55°C

Humidity:

- Operating: 35% to 80%
- Transit: 20% to 90% (40°C)
- Altitude: 86KPa to 106KPa

Electrical input:

- Input voltage: 90V-264V(AC)
- Input frequency: 47Hz-63Hz

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# Chapter 4. General Checkout

**Attention:** The drives in the computer you are servicing might have been rearranged or the drive startup sequence changed. Be extremely careful during write operations such as copying, saving, or formatting. Data or programs can be overwritten if you select an incorrect drive.

General error messages appear if a problem or conflict is found by an application program, the operating system, or both. For an explanation of these messages, refer to the information supplied with that software package.

Use the following procedure to help determine the cause of the problem:

1. Power-off the computer and all external devices.
2. Check all cables and power cords.
3. Set all display controls to the middle position.
4. Power-on all external devices.
5. Power-on the computer.
   - Look for displayed error codes
   - Look for readable instructions or a main menu on the display.

     If you did not receive the correct response, proceed to step 6.

     If you do receive the correct response, proceed to step 7.
6. Look at the following conditions and follow the instructions:
   - If the computer displays a POST error, go to “POST error codes”.
   - If the computer hangs and no error is displayed, continue at step 7.
7. If the test stops and you cannot continue, replace the last device tested.

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# Chapter 5. Using the Setup Utility

The Setup Utility program is used to view and change the configuration settings of your computer, regardless of which operating system you are using. However, the operating-system settings might override any similar settings in the Setup Utility program.

## Starting the Lenovo BIOS Setup Utility program

To start the Lenovo BIOS Setup Utility program, do the following:

1. If your computer is already on when you start this procedure, shut down the operating system and turn off the computer.
2. Press and hold the **F1** key then turn on the computer. When the Lenovo BIOS Setup Utility program is displayed, release the **F1** key.

**Note:** If a Power-On Password or an Administrator Password has been set, the Setup Utility program menu is not displayed until you type your password. For more information, see "Using passwords."

## Viewing and changing settings

System configuration options are listed in the Lenovo BIOS Setup Utility program menu. To view or change settings, see "Starting the Setup Utility program."

You must use the keyboard when using the Lenovo BIOS Setup Utility menu. The keys used to perform various tasks are displayed on the bottom of each screen.

## Using passwords

You can use the Lenovo BIOS Setup Utility program to set passwords to prevent unauthorized persons from gaining access to your computer and data. See "Starting the Setup Utility program." The following types of passwords are available:

- Administrator Password
- Power-On Password

You do not have to set any passwords to use your computer. However, if you decide to set passwords, read the following sections.

**Password considerations**

A password can be any combination of letters and numbers up to 16 character (a-z, and 0-9). For security reasons, it is a good idea to use a strong password that cannot be easily compromised. We suggest that passwords should follow these rules:

- Strong passwords contain 7-16 characters, combine letters and numbers.
- Do not use your name or your user name.
- Do not use a common word or a common name.
- Be significantly different from your previous password.

**Attention:** Administrator and Power-On passwords are not case sensitive

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### Administrator Password

Setting an Administrator Password deters unauthorized persons from changing configuration settings. You might want to set an Administrator Password if you are responsible for maintaining the settings of several computers.

After you set an Administrator Password, a password prompt is displayed every time you access the Lenovo BIOS Setup Utility program.

If both the Administrator and Power-On Password are set, you can type either password. However, you must use your Administrator Password to change any configuration settings.

#### Setting, changing, or deleting an Administrator password

To set an Administrator Password, do the following:

**Note:** A password can be any combination of letters and numbers up to 16 character (a-z, and 0-9). For more information, see "Password considerations" on page 13.

1. Start the Lenovo BIOS Setup Utility program (see "Starting the Lenovo BIOS Setup Utility program" on page 13).
2. From the **Security** menu, select **Set Administrator Password** and press the **Enter** key.
3. The password dialog box will be displayed. Type the password then press the **Enter** key.
4. Re-type the password to confirm, then press the **Enter** key. If you type the password correctly, the password will be installed.

To change an Administrator Password, do the following:

1. Start the Lenovo BIOS Setup Utility program (see "Starting the Lenovo BIOS Setup Utility program" on page 13).
2. From the **Security** menu, select **Set Administrator Password** and press the **Enter** key.
3. The password dialog box will be displayed. Type the current password then press **Enter** key.
4. Type the new password, then press **Enter** key. Re-type the password to confirm the new password, if you type the new password correctly, the new password will be installed. A Setup Notice will display that changes have been saved.

To delete a previously set Administrator Password, do the following :

1. From the **Security** menu, select **Set Administrator Password** and press the **Enter** key.
2. The password dialog box will be displayed. Type the current password and press the **Enter** key.
3. To delete an **Administrator Password**, **Enter** blank fields for each new password line item. A setup notice will display that changes have been saved.
4. Return to the Lenovo BIOS Setup Utility program menu and select the **Exit** option.
5. Select **Save changes and Exit** from the menu.

### Power-On Password

When a Power-On Password is set, you cannot start the Lenovo BIOS Setup Utility program until a valid password is typed from the keyboard.

#### Setting, changing, or deleting a Power-On Password

**Note:** A password can be any combination of letters and numbers up to 16 character (a-z, and 0-9).

To set a Power-On Password, do the following:

1. Start the Lenovo BIOS Setup Utility program (See ”Starting the Lenovo BIOS Setup Utility program” on page 13.)
2. From the **Security** menu, select **Set Power-On Password** and press the **Enter** key.
3. The password dialog box will be displayed. Type the password, and press the **Enter** key.
4. Re-type the password to confirm, if you type the password correctly, the password will be installed.

To change a Power-On Password, do the following:

1. Start the Lenovo BIOS Setup Utility program (See ”Starting the Lenovo BIOS Setup Utility program” on page 13.)
2. From the **Security** menu, select **Set Power-On Password** and press the **Enter** key.
3. The password dialog box will be displayed. Type the current password then press the **Enter** key.
4. Type the new password, then press the **Enter** key. Re-type the password to confirm the new password, if you type the new password correctly, the new password will be installed. A setup notice will display that changes have been saved.

To delete a previously set Power-On Password, do the following :

1. From the **Security** menu, select **Set Power-On Password** and press the **Enter** key.
2. The password dialog box will be displayed. Type the current password and press the **Enter** key.
3. To delete the **Power-On Password**, **Enter** blank fields for each new password line item. A setup notice will display that changes have been saved.
4. Return to the Lenovo BIOS Setup Utility program menu and select the **Exit** option.
5. Select **Save changes and Exit** from the menu.

## Enabling or disabling a device

| The **Devices** options is used to enable or disable user access to the following devices: | |
|---|---|
| **USB Functions** | Select whether to enable or disable **USB** (Universal Serial Bus) functions. If the functions are disabled, no **USB** devices can be used. |
| **ATA Drive Setup** | Select IDE or ACHI mode. Device driver support is required for ACHI mode. Depending on how the hard disk image was installed, changing this setting may prevent the system from booting. |
| **Onboard Audio Controller** | Select whether to enable or disable the **Onboard Audio Controller**, when feature is set to Disabled all devices connected to the audio connectors (e.g. a headphone or a microphone) are disabled and can’t be used. |
| **Onboard Ethernet Controller or Boot Agent** | Select whether to enable or disable **Onboard Ethernet Controller**, or select whether to enable or disable load onboard **PXE** (**Preboot Execution Environment**), or **SMC** (**Secure Managed Client**). This feature will allow the computer to boot from a server image. |

To enable or disable a device, do the following:

1. Start the Setup Utility program (see “Starting the Setup Utility program” on page 13).
2. From the Setup Utility program menu, select **Devices**.
3. Select:

**USB Setup** press the **Enter** key, and then select **USB Functions**.

**ATA Device Setup** press the **Enter** key. Select **Configure SATA as**, press the **Enter** key and then select SATA mode.

**Audio Setup** press the **Enter** key, and then select **Onboard Audio Controller**.

**Network Setup** press the **Enter** key, then select **Onboard Ethernet Support** or **Boot Agent**.

4. Select **Disabled** or **Enabled** and press the **Enter** key.
5. Return to the Lenovo BIOS Setup Utility program menu and select the **Exit** option.
6. Select **Save changes and Exit** from the menu.

   **Note:** If you do not want to save the settings, select **Discard changes and Exit** from the menu.

## Selecting a startup device

If your computer does not boot from a device such as the CD/DVD-ROM drive disk or hard disk as expected, follow one of the procedures below.

### Selecting a temporary startup device

Use this procedure to startup from any boot device.

**Note:** Not all CDs, DVDs or hard disk drives are bootable.

1. Turn off your computer.
2. Press and hold the **F12** key then turn on the computer. When the **Startup Device Menu** appears, release the **F12** key.

   **Note:** If the **Startup Device Menu** does not display using these steps, repeatedly press and release the **F12** key rather than keeping it pressed when turning on the computer.
3. Use ↑ and ↓ arrows to select the desired startup device from the **Startup Device Menu** and press the **Enter** key to begin.

   **Note:** Selecting a startup device from the **Startup Device Menu** does not permanently change the startup sequence.

### Selecting or changing the startup device sequence

To view or permanently change the configured startup device sequence, do the following:

1. Start the Lenovo BIOS Setup Utility program (see "Starting the Lenovo BIOS Setup Utility program" on page 13).
2. From the Lenovo BIOS Setup Utility program main menu, select the **Startup** option.
3. Press the **Enter** key, and select the devices for the **Primary Boot Sequence**. Read the information displayed on the right side of the screen.
4. Use - and ¯ arrows to select a device. Use the **<+>** or **<->** keys to move a device up or down. Use the **<x>** key to exclude the device from or include the device in the boot sequence.
5. Return to the Lenovo BIOS Setup Utility program menu and select the **Exit** option.
6. Select **Save changes and Exit** from the menu.

   **Notes:**

   a. If you do not want to save the settings, select **Discard changes and Exit** from the menu.

b. If you have changed these settings and want to return to the default settings, select **Load Optimal Defaults** from the menu.

## Exiting the Lenovo BIOS Setup Utility program

After you finish viewing or changing settings, press the **Esc** key to return to the Lenovo BIOS Setup Utility program main menu. You might have to press the **Esc** key several times. Do one of the following:

- If you want to save the new settings, select **Save changes and Exit** from the menu. When the **Save & reset** window shows, select the **Yes** button, and then press the **Enter** key to exit the Lenovo BIOS Setup Utility program.
- If you do not want to save the settings, select **Discard changes and Exit** from the menu. When the **Reset Without Saving** window shows, select the **Yes** button, and then press the **Enter** key to exit the Setup Utility program.

# Chapter 6. Symptom-to-FRU Index

The Symptom-to-FRU index lists error symptoms and possible causes. The most likely cause is listed first. Always begin with Chapter 4, "General Checkout," on page 11. This index can also be used to help you decide which FRUs to have available when servicing a computer. If you are unable to correct the problem using this index, go to "Undetermined problems" on page 20.

**Notes:**

- If you have both an error message and an incorrect audio response, diagnose the error message first.
- If you cannot run the diagnostic tests or you get a diagnostic error code when running a test but did receive a POST error message, diagnose the POST error message first.
- If you did not receive any error message look for a description of your error symptoms in the first part of this index.

## Hard disk drive boot error

A hard disk drive boot error can have the following causes.

| **Error** | **FRU/Action** |
|---|---|
| The startup drive is not included in the boot sequence in configuration. | Check the configuration and ensure the startup drive is in the boot sequence. |
| No operating system installed on the boot drive. | Install an operating system on the boot drive. |
| The boot sector on the startup drive is corrupted. | The drive must be formatted. Do the following:<br>1. Attempt to back-up the data on the failing hard disk drive.<br>2. Use the operating system to format the hard disk drive. |
| The drive is defective. | Replace the hard disk drive. |

## Power Supply Problems

Follow these procedures if you suspect there is a power supply problem.

| **Check/Verify** | **FRU/Action** |
|---|---|
| Check that the following are properly installed:<br>• Power Cord<br>• On/Off Switch connector<br>• System Board Power Supply connectors<br>• Microprocessor(s) connection | Reseat connectors |
| Check the power cord. | Power Cord |
| Check the power-on switch. | Power-on Switch |

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## POST error codes

Each time you turn the computer on, it performs a series of tests to check that the system is operating correctly and that certain options are set. This series of tests is called the *Power-On Self-Test*, or *POST*. POST does the following:

- Checks some basic system-board operations
- Checks that the memory is working correctly
- Starts video operations
- Verifies that the boot drive is working

| POST Error Message | Description/Action |
| --- | --- |
| Keyboard error | Cannot initialize the keyboard. Make sure the keyboard is properly connected to the computer and that no keys are held pressed during POST. To purposely configure the computer without a keyboard, select **Keyboardless operation** in **Startup** option to **Enabled**. The BIOS then ignores the missing keyboard during POST. |
| Reboot and Select proper Boot device or Insert Boot Media in selected Boot device | The BIOS was unable to find a suitable boot device. Make sure the boot drive is properly connected to the computer. Make sure you have bootable media in the boot device. |

## Undetermined problems

1. Power-off the computer.
2. Remove or disconnect the following components (if connected or installed) one at a time.
   a. External devices (modem, printer, or mouse)
   b. Extended video memory
   c. External Cache
   d. External Cache RAM
   e. Hard disk drive
   f. Disk drive
3. Power-on the computer to re-test the system.
4. Repeat steps 1 through 3 until you find the failing device or component.

If all devices and components have been removed and the problem continues, replace the system board.

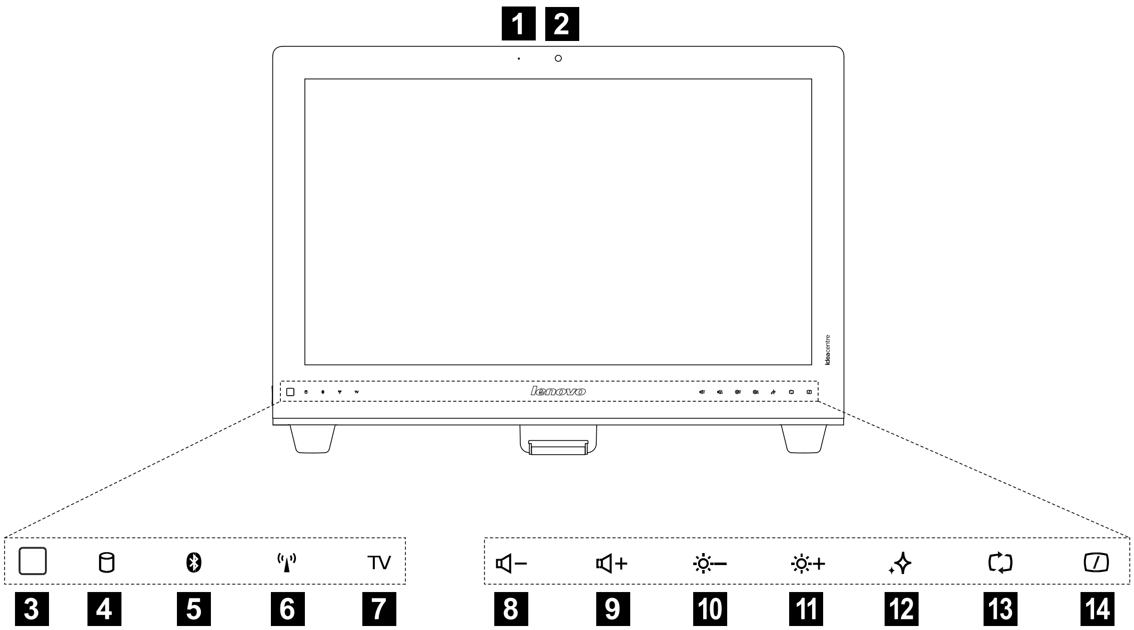
# Chapter 7. Locating connectors, controls and components

This section provides illustrations to help locate the various connectors, controls and components of the computer.

### Font view

The following illustration shows the location of controls and components on the front of the computer.

**Attention:** Be careful not to block any air vents on the computer. Blocked air vents can cause overheating.



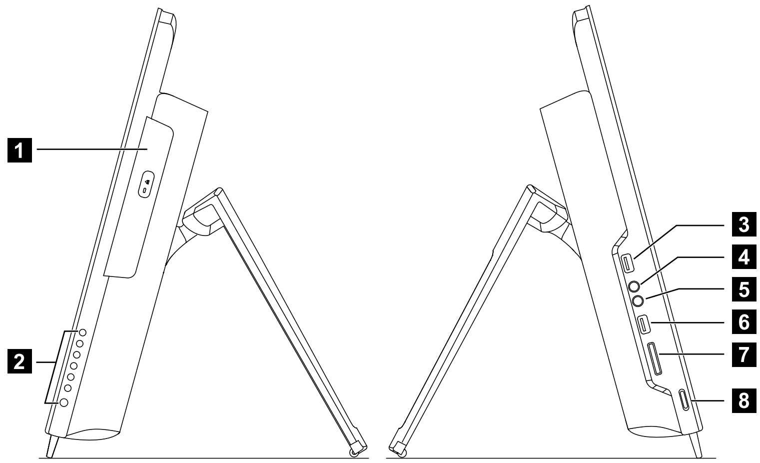

| | |
|---|---|
| 1. Built-in microphone | 8. Volume down |
| 2. Built-in camera | 9. Volume up |
| 3. Built-in IR Emitter (do not block, selected models only) | 10. Brightness down |
| 4. Hard disk drive indicator | 11. Brightness up |
| 5. Bluetooth status indicator | 12. Novo vision button |
| 6. Wi-Fi status indicator | 13. PC mode / HDMI-in / AV-in switch |
| 7. TV indicator | 14. Monitor On/Off |

**Attention:** The effective range of the Built-in IR Emitter is 10 feet (3m).

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### Left and right view

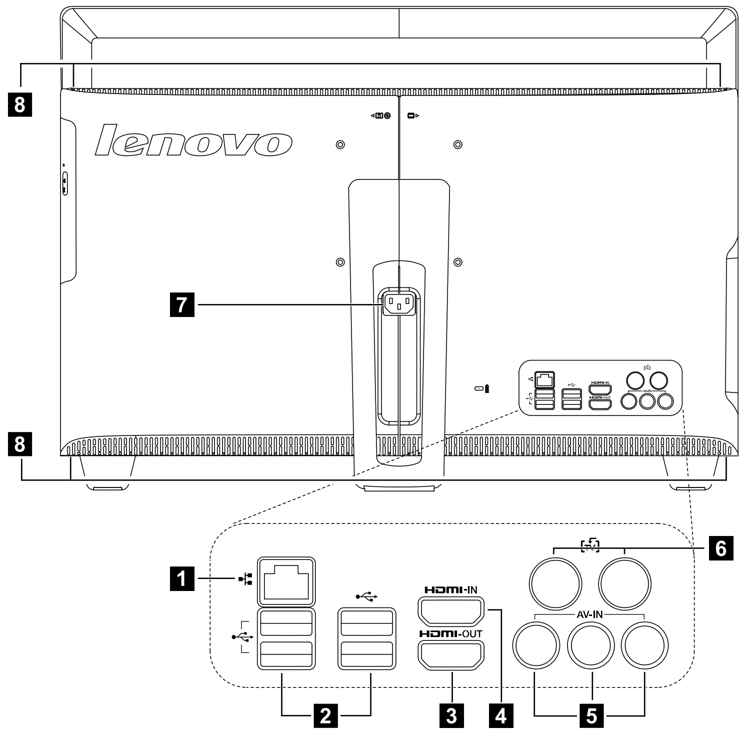
The following illustration shows the location of connectors, controls and components on the left and right side of the computer.




| | |
|---|---|
| 1. Optical drive | 5. Microphone port |
| 2. TV buttons (selected models only) | 6. USB connector |
| 3. USB connector | 7. Memory card reader |
| 4. Headphone port | 8. Power button |

## Rear view

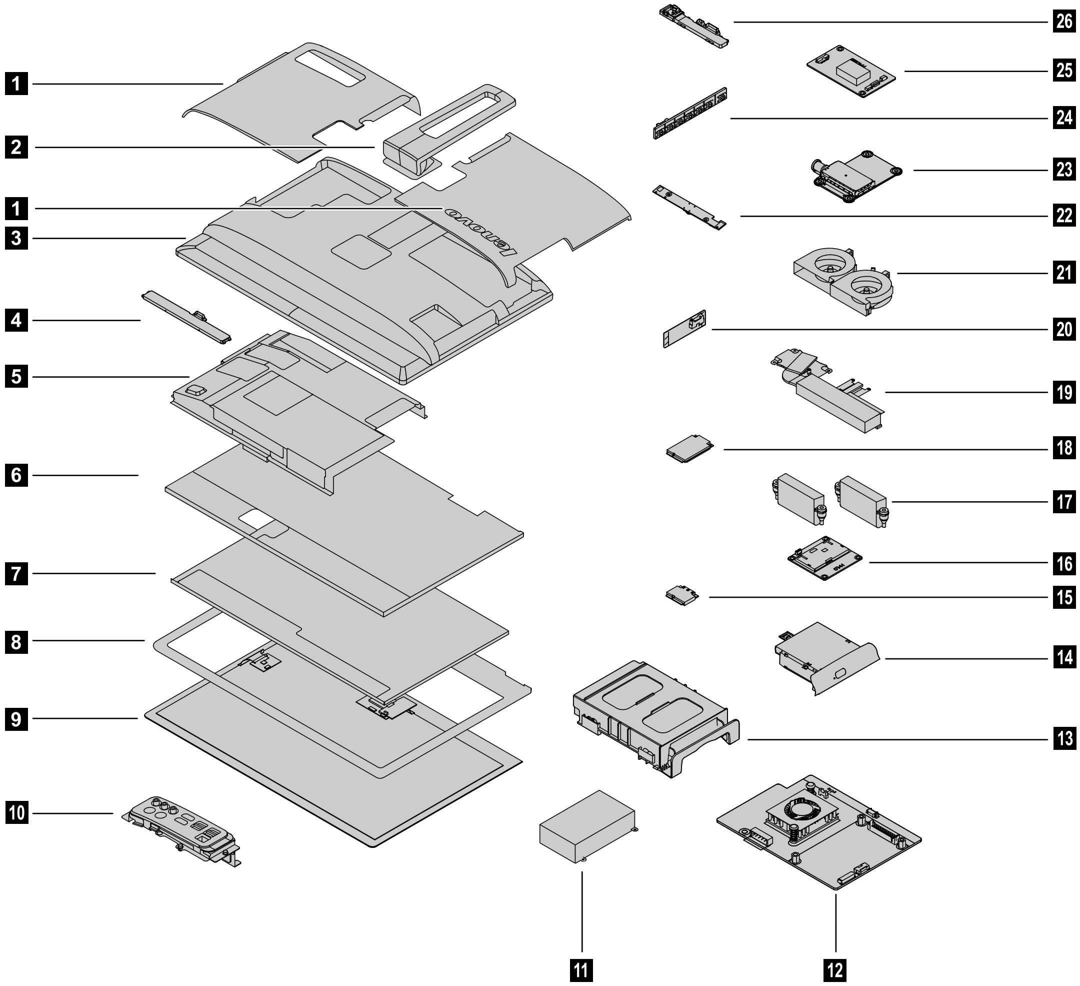
The following illustration shows the location of connectors and components on the rear of the computer.




| | |
|---|---|
| 1. Ethernet port | 5. AV-IN connectors (selected models only) |
| 2. USB connectors | 6. TV tuner ports (selected models only) |
| 3. HDMI-OUT connector | 7. Power connector |
| 4. HDMI-IN connector (selected models only) | 8. Air vents (do not block) |

## Hardware components

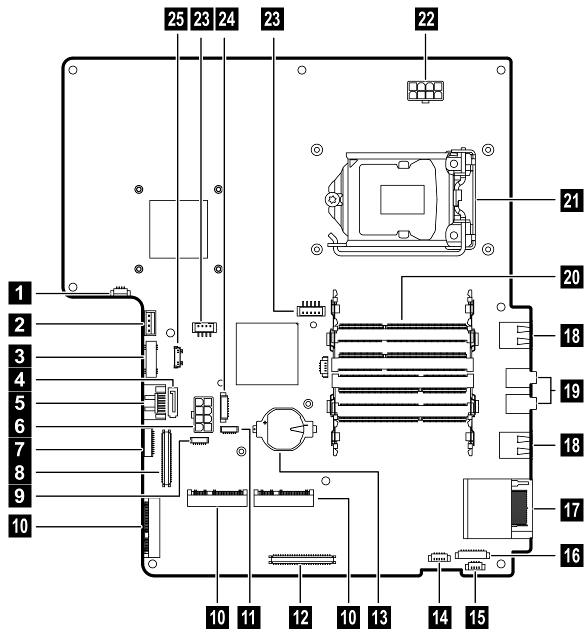
The following illustration shows the components that make up your computer.




| | |
|---|---|
| 1. Rear cover | 14. Optical disk drive |
| 2. Computer stand | 15. Hardware TV Scale Board |
| 3. Middle cover | 16. WLAN card |
| 4. Front LED indicator board | 17. Speakers |
| 5. EMI cover | 18. Converter |
| 6. Chassis | 19. Heat-sink |
| 7. LED panel | 20. Infra red module |
| 8. Front bezel | 21. System fans |
| 9. Glass | 22. Camera |
| 10. Rear I/O module | 23. Hardware TV tuner board |
| 11. Power supply | 24. Hardware TV switch board |
| 12. Motherboard | 25. Touch module |
| 13. Hard disk drive | 26. Bluetooth module |

## Identifying parts on the motherboard

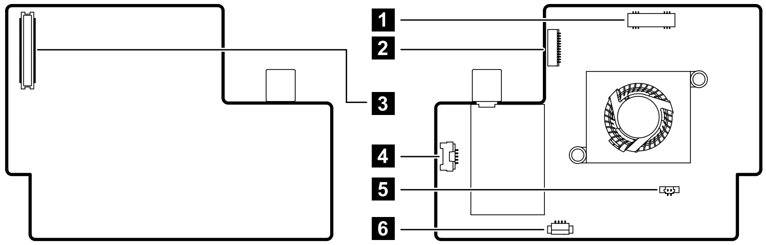
The motherboard (sometimes called the planar or system board) is the main circuit board in your computer. It provides basic computing functions and supports a variety of devices that are factory-installed or that you can install later. The following illustration shows the location of connectors and components on the front of the motherboard.




| | |
|---|---|
| 1. Touch Control Board Connector | 14. Power Connector |
| 2. SATA Power Connector | 15. Speaker Connector |
| 3. LVDS Connector | 16. LED Board Connector |
| 4. SATA Connector | 17. Card Reader |
| 5. SATA Connector | 18. USB Connector |
| 6. PSU P1 Connector | 19. Audio Connector |
| 7. Converter Connector | 20. Memory Connectors |
| 8. HWTV Module Connector | 21. CPU Socket |
| 9. B-CAS Connector | 22. PSU P2 Connector |
| 10. Mini PCI Connector | 23. Fan Connector |
| 11. Bluetooth Connector | 24. Touch Function Board Connector |
| 12. Rear I/O Connector | 25. Webcam Connector |
| 13. BIOS Battery | |

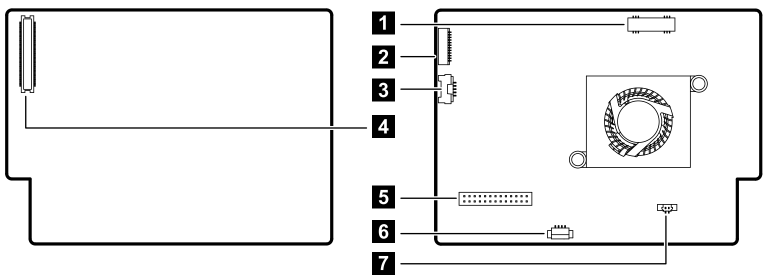
### Identifying parts and connectors on the hardware TV scale board

The following illustration shows the locations of parts on the analog hardware TV board.



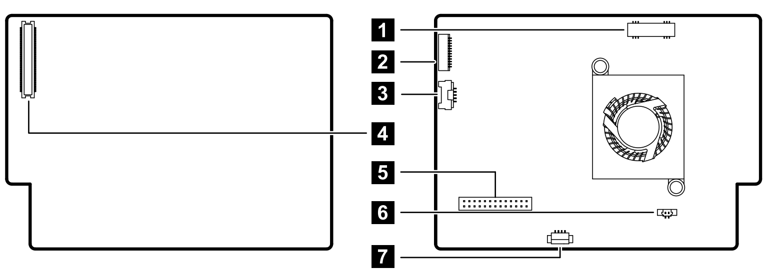

| | |
|---|---|
| 1. LVDS Connector | 4. TV Function Connector |
| 2. Converter Connector | 5. Fan Connector |
| 3. Mother Board Connector | 6. Debug Port |

The following illustration shows the locations of parts on the digital hardware TV board. (ATS-C type)




| | |
|---|---|
| 1. LVDS Connector | 5. Tuner Board Connector |
| 2. Converter Connector | 6. Debug Port |
| 3. TV Function Connector | 7. Fan Connector |
| 4. Mother Board Connector | |

The following illustration shows the locations of parts on the digital hardware TV board. (DVB-T type)




| | |
|---|---|
| 1. LVDS Connector | 5. Tuner Board Connector |
| 2. Converter Connector | 6. Fan Connector |
| 3. TV Function Connector | 7. Debug Port |
| 4. Mother Board Connector | |

# Chapter 8. Replacing hardware

**Attention:** Do not remove the computer cover or attempt any repair before reading the "Important safety information" in the Safety and Warranty Guide that was included with your computer. To obtain copies of the Safety and Warranty Guide, go to the Support Web site at: http://consumersupport.lenovo.com.

**Note:** Use only parts provided by Lenovo.

## General information

### Pre-disassembly instructions

Before proceeding with the disassembly procedure, make sure that you do the following:

1. Turn off the power to the system and all peripherals.
2. Unplug all power and signal cables from the computer.
3. Place the system on a flat, stable surface.

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## Replacing the keyboard and mouse

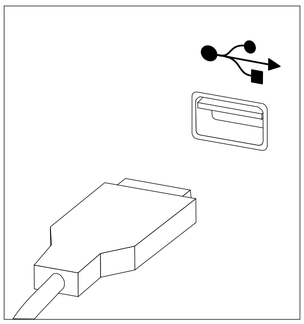
**Attention:** Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

**To replace the keyboard and mouse**

Step 1. Remove any media (disks, CDs, DVDs or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.

Step 2. Unplug all power cords from electrical outlets.

Step 3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to "Left and right view" and "Rear view" for help with locating the various connectors.



**Note:** Your keyboard will be connected to a USB connector on one side or at the rear of the computer.

Step 4. Disconnect the defective keyboard cable from the computer and connect the new keyboard cable to the same connector.

**Note:** The mouse can be replaced using the same method.

## Replacing the power cord or power adapter

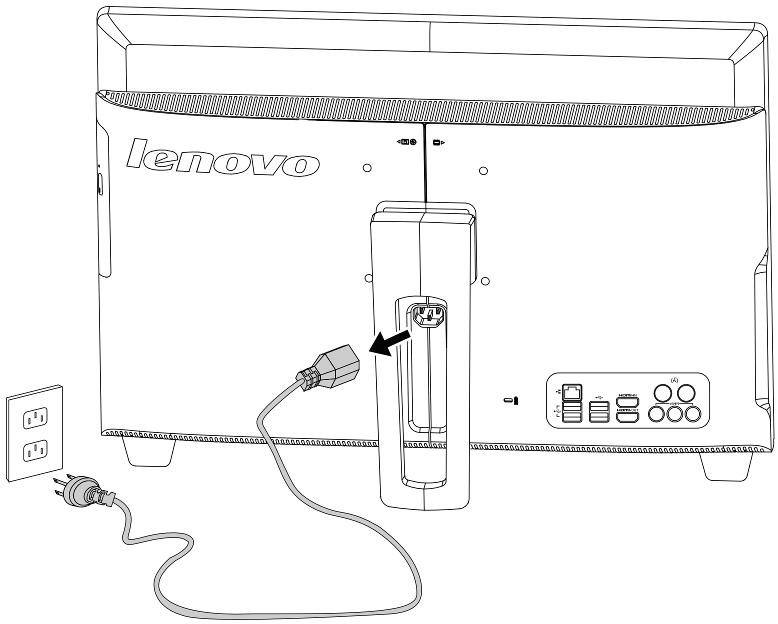
**Attention:** Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

**To replace the power cord and power adapter:**

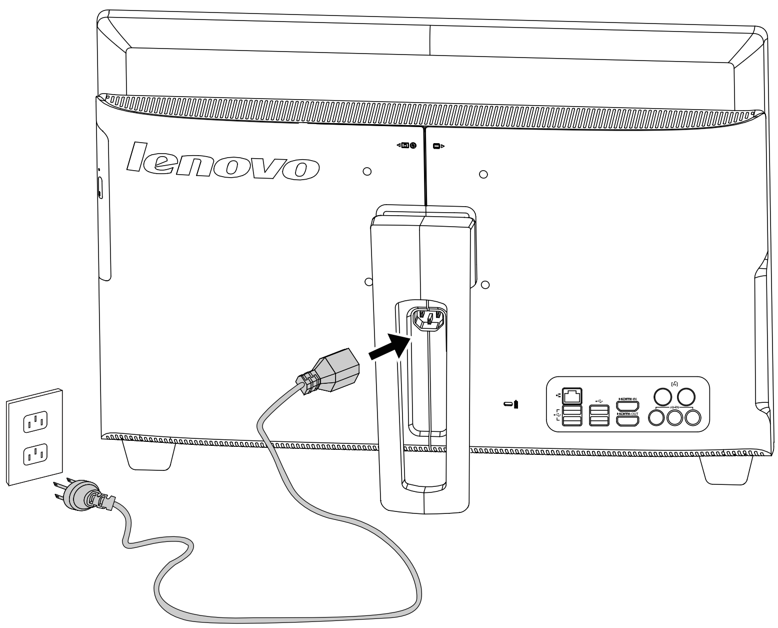
Step 1. Remove any media (diskettes, CDs, DVDs, or memory cards) from the drives, shut down your operating system, and turn off all attached devices and the computer.

Step 2. Locate the connector for the power cord. Refer to "Rear view".

Step 3. Disconnect the failing power cord and adapter from the computer.



Step 4. Connect the new power cord to the same connector as shown.



## Removing the computer cover

**Attention:** Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

**Note:** It may be helpful to place the computer face-down on a soft flat surface for this procedure. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the computer screen from scratches or other damage.

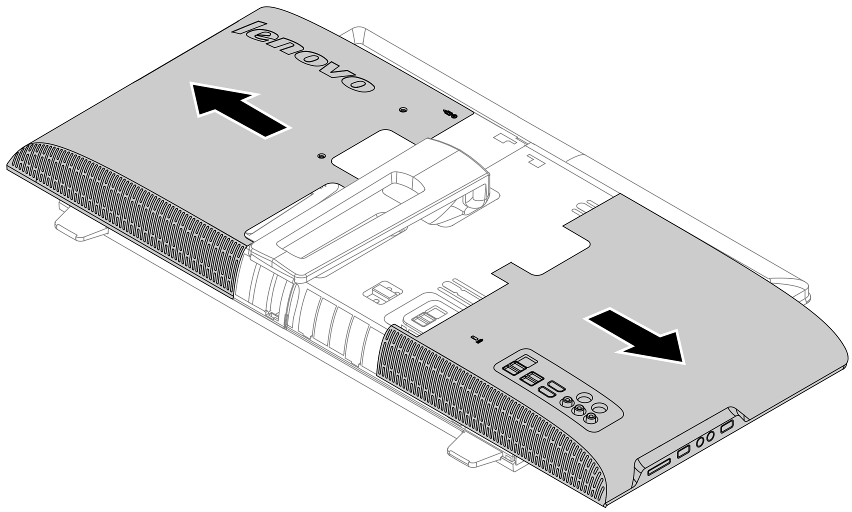
**To remove the computer cover:**

Step 1. Remove any media (disks, CDs, DVDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.

Step 2. Unplug all power cords from electrical outlets.

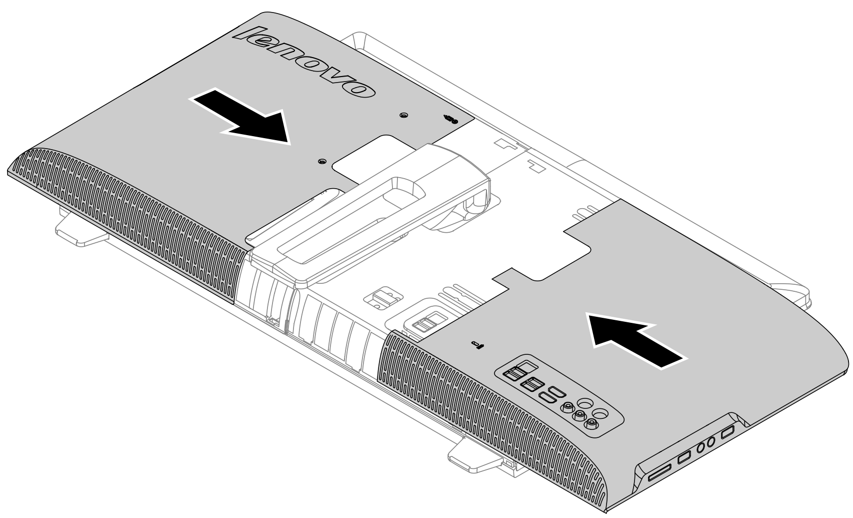
Step 3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to "Left and right view" and "Rear view" for help with locating the various connectors.

Step 4. Remove the 2 cover pieces by sliding them in opposite directions as shown.




Step 5. To reinstall the computer cover:

a. Line up the cover pieces with the chassis then slide them back.




## Removing the computer stand

**Note:** Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

**Note:** For this procedure, it helps to place the computer face-down on a soft flat surface. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the screen surface from scratches or other damage.

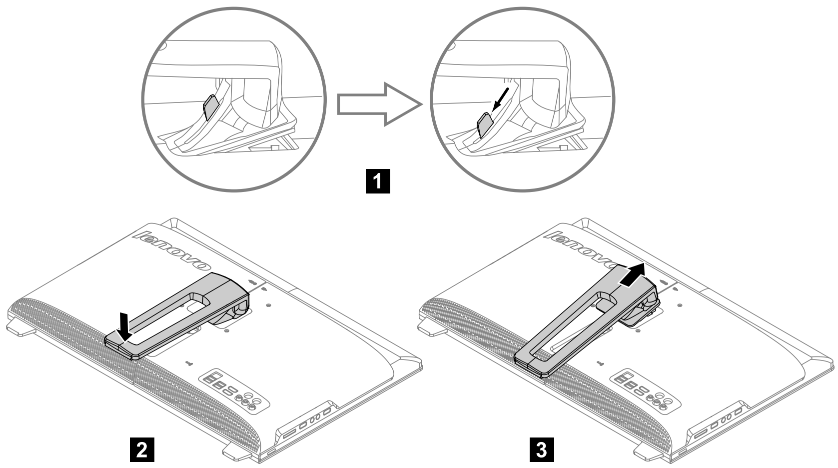
**To remove the computer stand:**

Step 1. Remove any media (disks, CDs, DVDs or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.

Step 2. Unplug all power cords from electrical outlets.

Step 3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to “Left and right view” and “Rear view” for help with locating the various connectors.

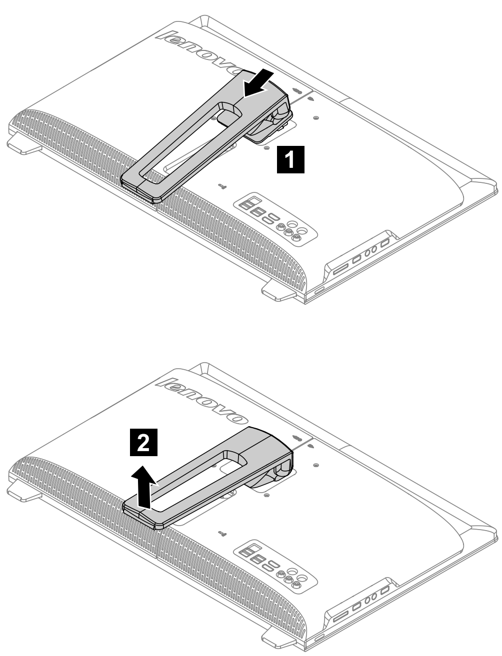
Step 4. Push the stand lock upward to unlock it and then slide the stand out as show. 1 2 3




Step 5. To reinstall the computer stand:

a. Line up the computer stand with the mounting slots in the chassis and slide it back into position. 1

b. Lift up the rear of the computer stand until you hear a “pa” sound indicating the stand has been locked. 2




## Replacing a memory module

**Attention:** Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

**Attention:** It may be helpful to place the computer face-down on a soft flat surface for this procedure. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the computer screen from scratches or other damage.

**To replace a memory module**

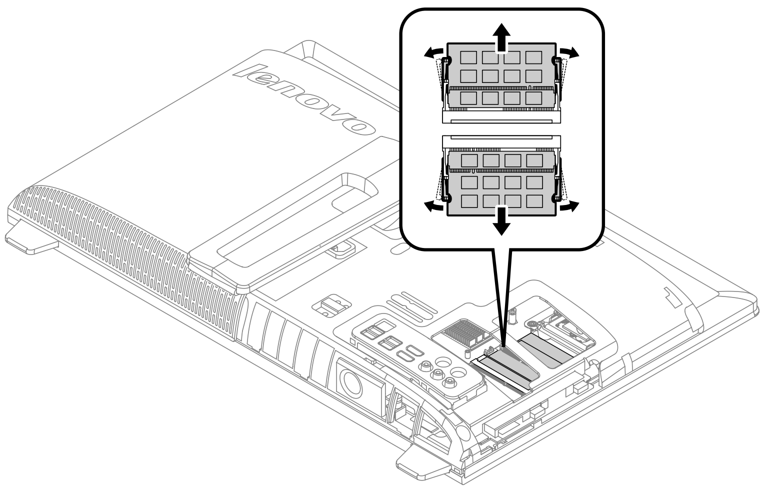
Step 1. Remove any media (disks, CDs, DVDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.

Step 2. Unplug all power cords from electrical outlets.

Step 3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to "Left and right view" and "Rear view" for help with locating the various connectors.

Step 4. Remove the rear cover. Refer to "Removing the rear cover".

Step 5. Push out the latches on both sides of the memory socket to release the memory module. Gently pull the memory module upward to remove it from its socket.



Step 6. Align the new memory module with the memory socket, then insert it and push down on the top edge. Make sure the latches lock the memory module in place.

Step 7. Reattach the rear cover.

## Replacing the hard disk drive

**Attention:** Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

**Attention:** It may be helpful to place the computer face-down on a soft flat surface for this procedure. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the computer screen from scratches or other damage.

**To replace the hard disk drive**

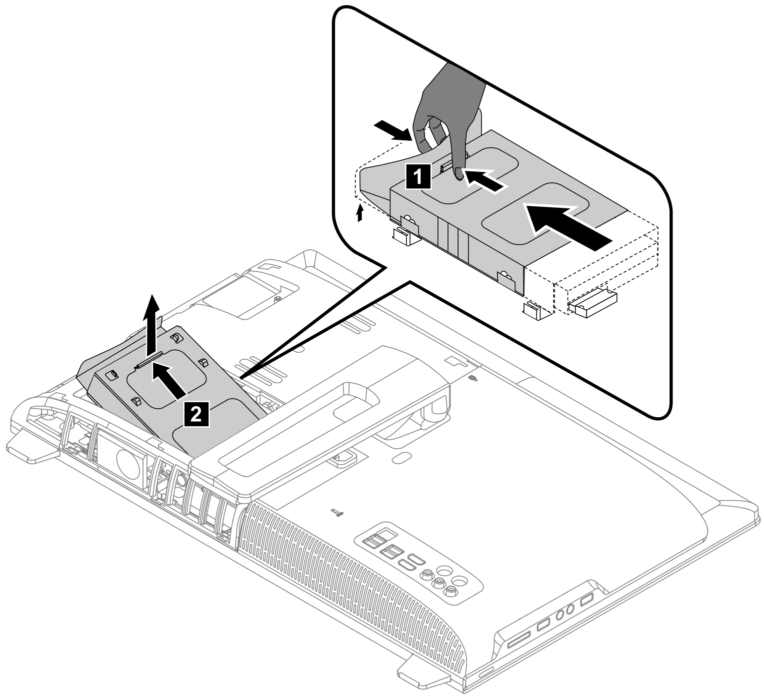
Step 1. Remove any media (disks, CDs, DVDs or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.

Step 2. Unplug all power cords from electrical outlets.

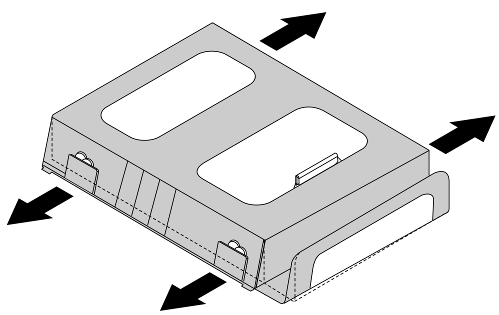
Step 3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to "Left and right view" and "Rear view" for help with locating the various connectors.

Step 4. Remove the rear cover. Refer to "Removing the rear cover".

Step 5. Push then slide the hard disk drive and bracket upward and out of the chassis as shown. 1 2




Step 6. Push the pins and release the hard disk drive from the bracket.



Step 7. Install the new hard disk drive as follows:

a. Line up the new hard disk drive with the bracket and secure it with the pins.

b. Slide the hard disk drive and bracket back into position.

Step 8. Reattach the rear cover.

## Replacing the optical drive

**Attention:** Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

**To replace the optical drive**

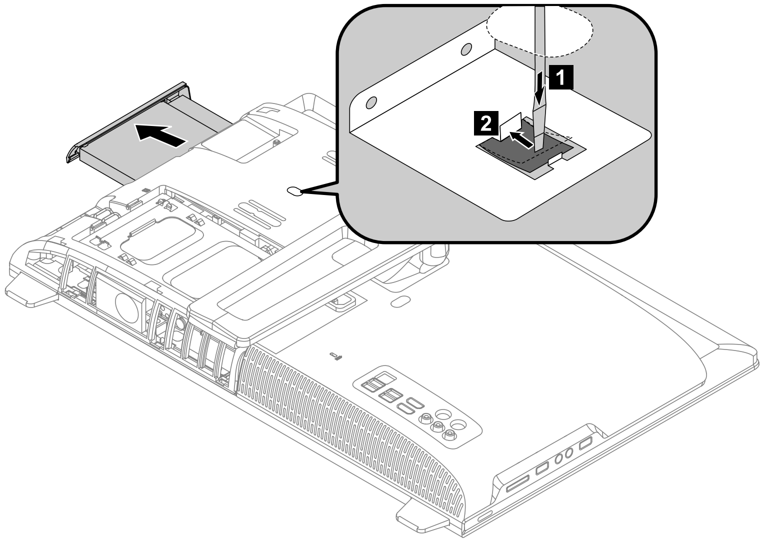
Step 1. Remove any media (disks, CDs, DVDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.

Step 2. Unplug all power cords from electrical outlets.

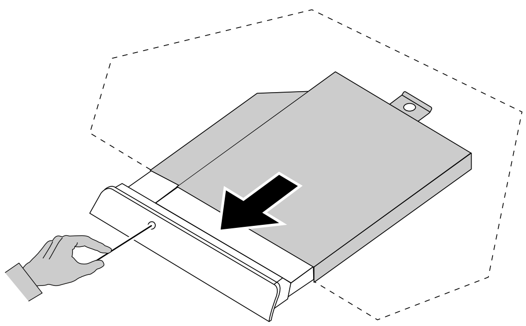
Step 3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to “Left and right view” and “Rear view” for help with locating the various connectors.

Step 4. Remove the rear cover. Refer to “Removing the rear cover”.

Step 5. Push down the pin that locks the optical disk drive to the chassis then use the screwdriver push the disk out. 1 2



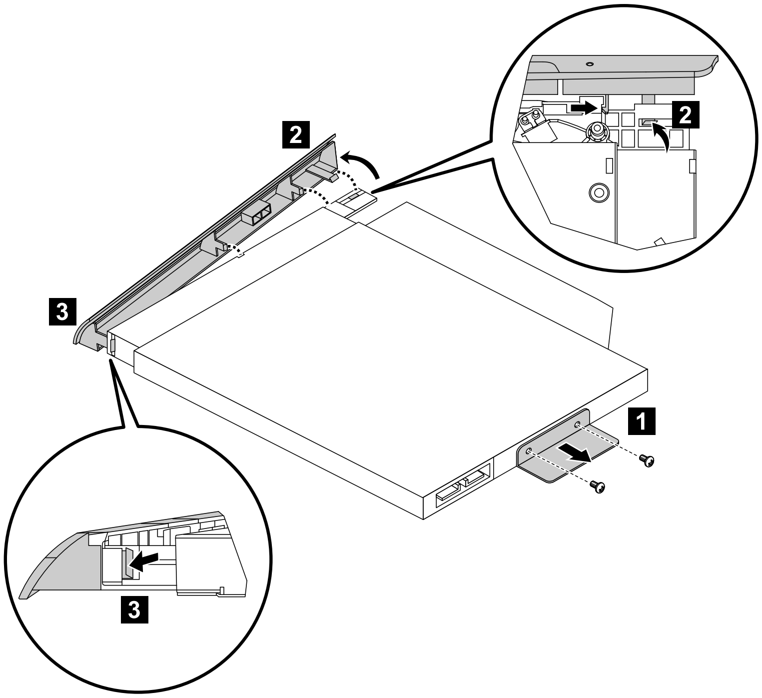

Step 6. Push a small iron stick (paper clip) into the small hole on the optical drive cover so that the disk springs out as shown.



Step 7. Remove the 2 screws that secure the optical drive to the metal bracket. 1

Step 8. Use a small flat head screwdriver to press and push out the pins that secure the cover to the disk. 2 3

Step 9. Separate the cover from the defective optical drive.




Step 10. Install the new optical drive as follows:

a. Align the new optical drive with the cover, and then push the cover back into position.

b. Screw the metal bracket back onto the new optical drive.

c. Slide the new optical drive into the drive bay.

Step 11. Slide the rear cover pieces back into position.

## Removing the middle cover

**Note:** Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

**Note:** It may be helpful to place the computer face-down on a soft flat surface for this procedure. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the computer screen from scratches or other damage.

**To remove the middle cover**

Step 1. Remove any media (disks, CDs, DVDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.

Step 2. Unplug all power cords from electrical outlets.

Step 3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to “Left and right view” and “Rear view” for help with locating the various connectors.

Step 4. Remove the rear cover. Refer to “Removing the rear cover”.

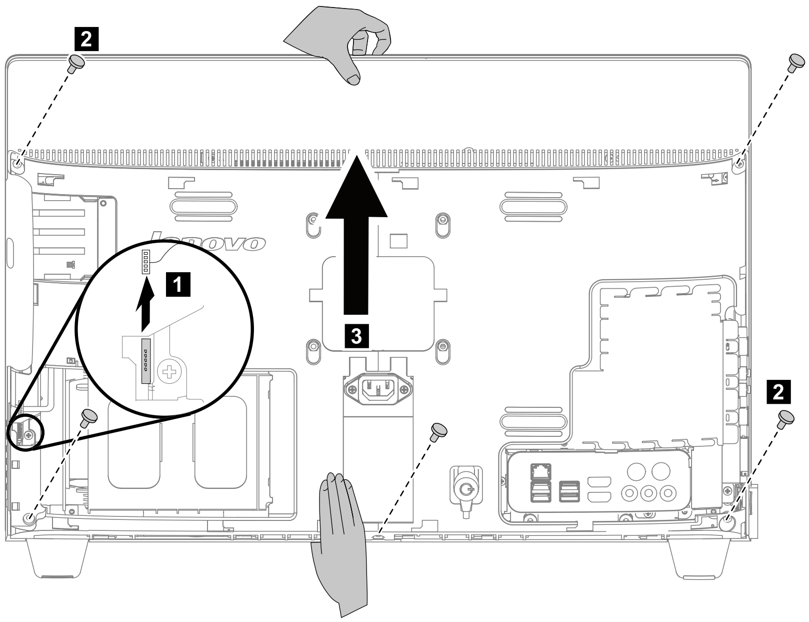
Step 5. Remove the computer stand. Refer to “Removing the computer stand”.

Step 6. Remove the optical drive. Refer to “Replacing the optical drive”.

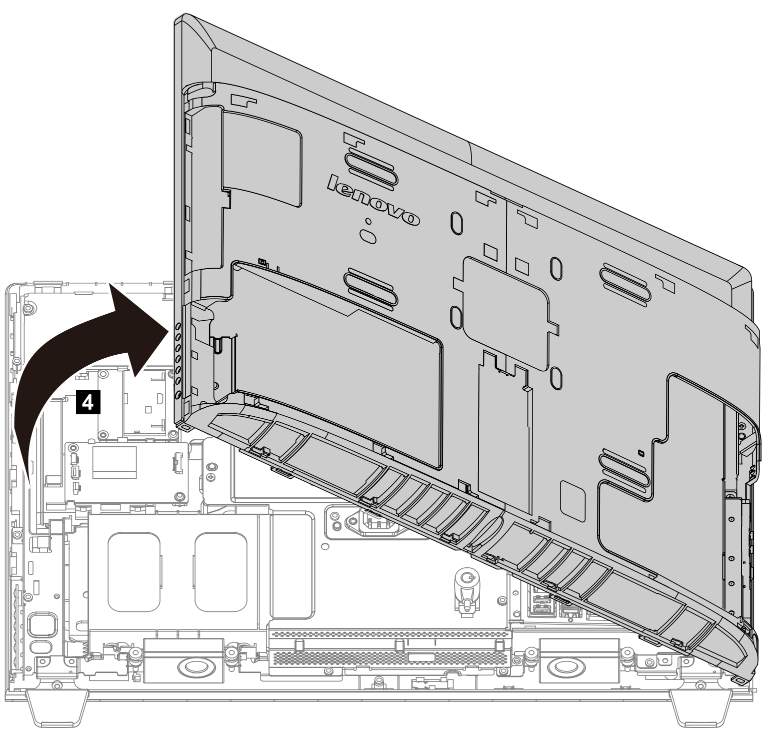
Step 7. Disconnect the Onekey TV cable from the connectors. **1**

Step 8. Remove the 5 screws that secure the middle cover to the chassis. **2**

Step 9. Push up the middle cover upward with two hands to remove it from pins. 3




Step 10. Slide the middle cover out as shown. 4 (From left to right)




Step 11. To reattach the middle cover:

a. Line up the middle cover with chassis, slide it back in position.

b. Push down the middle cover to secure it with the pins.

c. Secure the middle cover to the chassis with 5 screws.

d. Reconnect the TV cable to the same connector.

Step 12. Reattach the optical drive, computer stand and the rear cover.

## Replacing the converter board

**Note:** Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

**Note:** It may be helpful to place the computer face-down on a soft flat surface for this procedure. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the computer screen from scratches or other damage.

**To replace the converter board:**

Step 1. Remove any media (disks, CDs, DVDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.

Step 2. Unplug all power cords from electrical outlets.

Step 3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to "Left and right view" and "Rear view" for help with locating the various connectors.

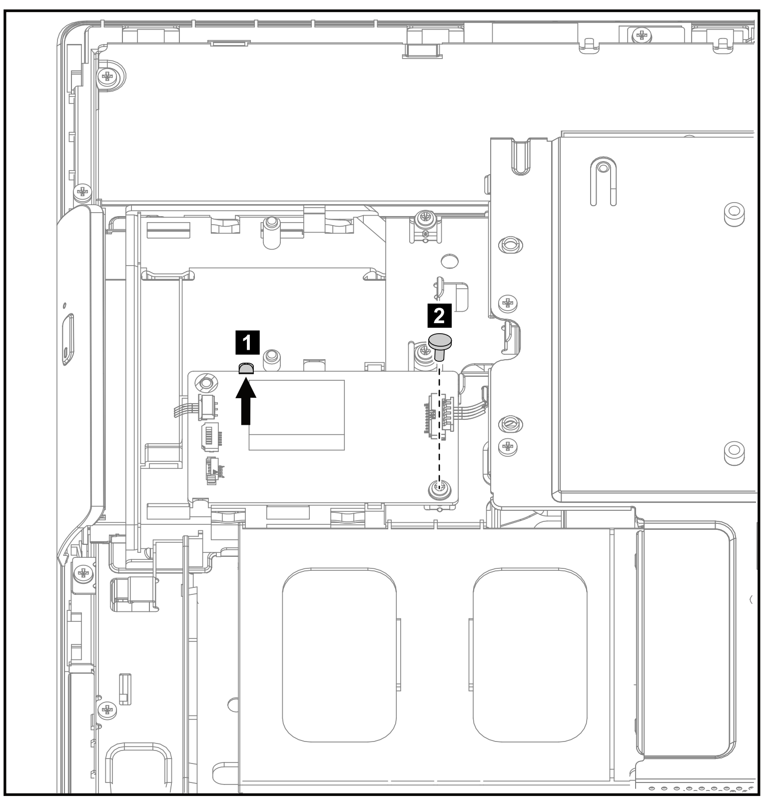
Step 4. Remove the rear cover. Refer to "Removing the rear cover".

Step 5. Remove the computer stand. Refer to "Removing the computer stand".

Step 6. Remove the optical drive. Refer to "Replacing the optical drive".

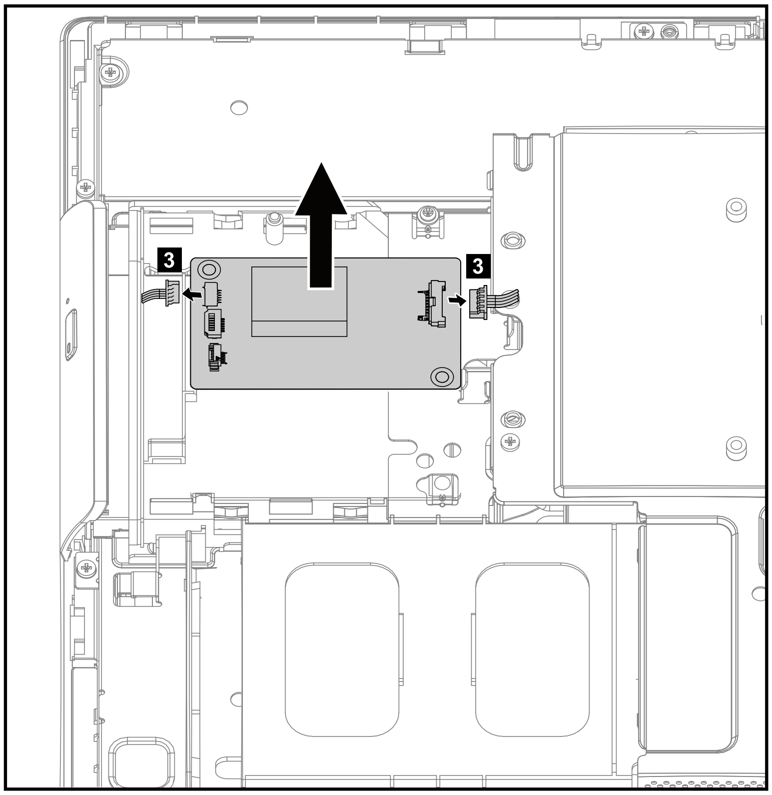
Step 7. Remove the middle cover. Refer to "Removing the middle cover".

Step 8. Remove the screw that secures the converter board to the chassis and push the pin to release the converter. **1** **2**




Step 9. Disconnect the 2 cables from the converter board. **3**

Step 10. Lift up the converter board to remove it.




Step 11. To install the new converter board:

a. Line up the new converter board with the mounting holes and pin, and then, secure converter board with screw and pins.

b. Connect the 2 cables to the new converter board.

c. Secure the converter board with the screw.

Step 12. Reattach the middle cover, optical drive, computer stand and the rear cover.

## Removing the EMI cover

**Note:** Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

**Note:** It may be helpful to place the computer face-down on a soft flat surface for this procedure. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the computer screen from scratches or other damage.

**To replace the EMI cover**

Step 1. Remove any media (disks, CDs, DVDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.

Step 2. Unplug all power cords from electrical outlets.

Step 3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to "Left and right view" and "Rear view" for help with locating the various connectors.

Step 4. Remove the rear cover. Refer to "Removing the rear cover".

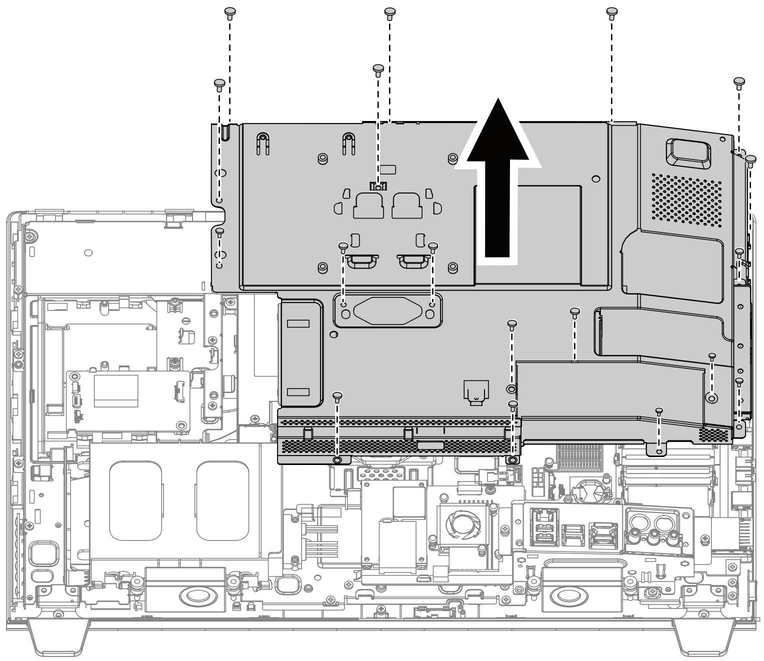
Step 5. Remove the computer stand. Refer to "Removing the computer stand".

Step 6. Remove the optical drive. Refer to “Replacing the optical drive”.

Step 7. Remove the middle cover. Refer to “Removing the middle cover”.

Step 8. Remove the screws that secure the EMI cover to the chassis.

Step 9. Lift up the EMI cover up to remove it.



Step 10. To reinstall the EMI cover:

a. Line up the EMI cover with the mounting holes on the chassis and secure it with screws.

Step 11. Reattach the middle cover, optical drive, computer stand and the rear cover.

## Replacing the camera

**Note:** Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

**Note:** It may be helpful to place the computer face-down on a soft flat surface for this procedure. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the computer screen from scratches or other damage.

**To replace the camera:**

Step 1. Remove any media (disks, CDs, DVDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.

Step 2. Unplug all power cords from electrical outlets.

Step 3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to “Left and right view” and “Rear view” for help with locating the various connectors.

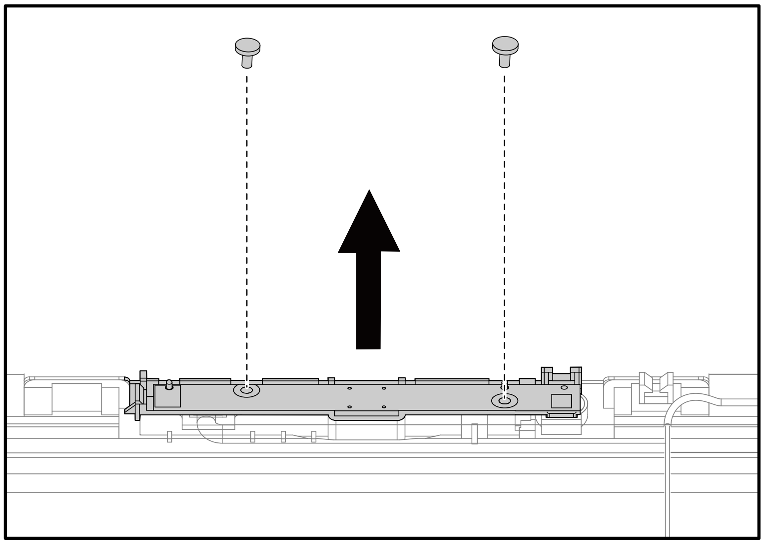
Step 4. Remove the rear cover. Refer to “Removing the rear cover”.

Step 5. Remove the computer stand. Refer to “Removing the computer stand”.

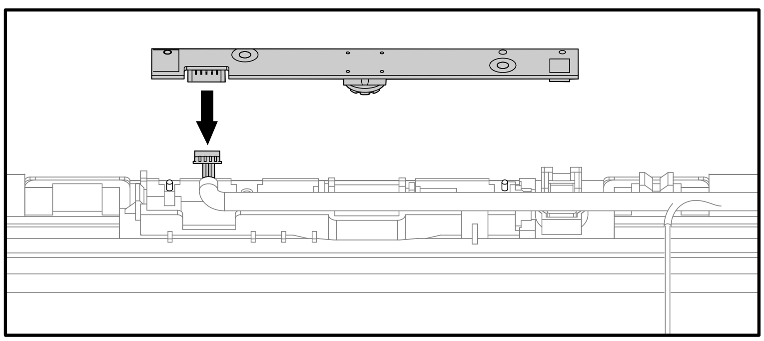
Step 6. Remove the optical drive. Refer to “Replacing the optical drive”.

Step 7. Remove the middle cover. Refer to “Removing the middle cover”.

Step 8. Remove the 2 screws that secure the camera to the front bezel.



Step 9. Disconnect the data cable from the camera.



Step 10. To install the new camera:

a. Connect the data cable to the new camera.

b. Line up the new camera holes with the mounting holes on the front bezel and secure it with the 2 screws.

Step 11. Reattach the middle cover, optical drive, computer stand and the rear cover.

## Replacing the Bluetooth module

**Attention:** Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

**Note:** It may be helpful to place the computer face-down on a soft flat surface for this procedure. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the computer screen from scratches or other damage.

**To replace the Bluetooth module:**

Step 1. Remove any media (disks, CDs, DVDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.

Step 2. Unplug all power cords from electrical outlets.

Step 3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to “Left and right view” and “Rear view” for help with locating the various connectors.

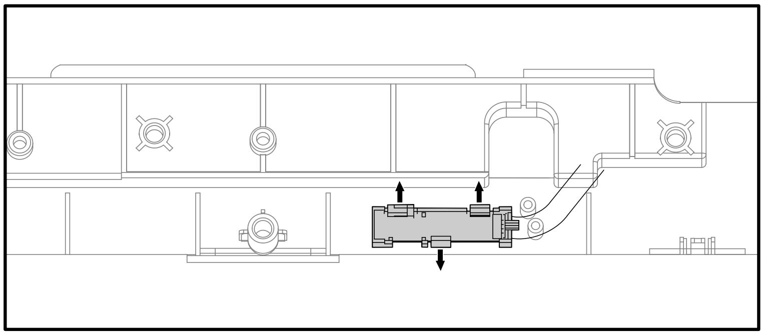
Step 4. Remove the rear cover. Refer to “Removing the rear cover”.

Step 5. Remove the computer stand. Refer to “Removing the computer stand”.

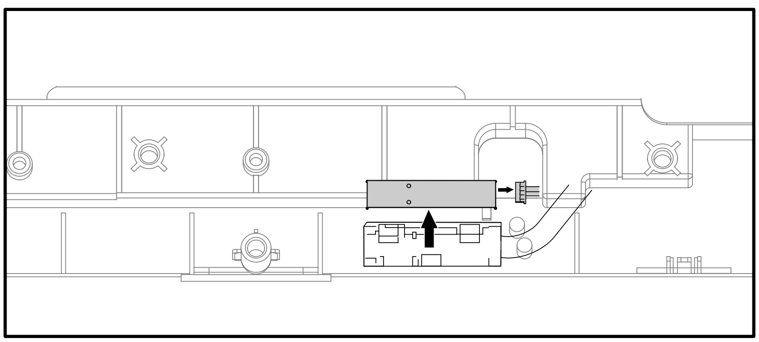
Step 6. Remove the optical drive. Refer to “Replacing the optical drive”.

Step 7. Remove the middle cover. Refer to “Removing the middle cover”.

Step 8. Push the pins to release the Bluetooth module.



Step 9. Disconnect the cable from the Bluetooth module.



Step 10. To install the new Bluetooth module:

a. Connect the cable to the new Bluetooth module.

b. Line up the new Bluetooth module with the socket, snap it into position and secure it with the pins.

Step 11. Reattach the middle cover, optical drive, computer stand and the rear cover.

## Replacing the battery

**Note:** Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

**Note:** It may be helpful to place the computer face-down on a soft flat surface for this procedure. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the computer screen from scratches or other damage.

**To replace the battery**

Step 1. Remove any media (disks, CDs, DVDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.

Step 2. Unplug all power cords from electrical outlets.

Step 3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to “Left and right view” and “Rear view” for help with locating the various connectors.

Step 4. Remove the rear cover. Refer to “Removing the rear cover”.

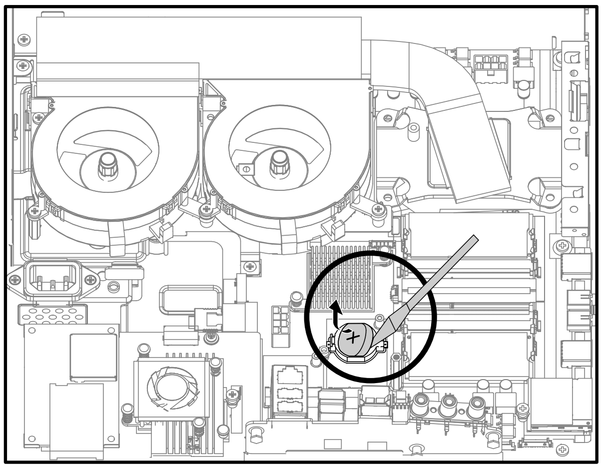
Step 5. Remove the computer stand. Refer to “Removing the computer stand”.

Step 6. Remove the optical drive. Refer to “Replacing the optical drive”.

Step 7. Remove the middle cover. Refer to “Removing the middle cover”.

Step 8. Remove the EMI cover. Refer to “Removing the EMI cover”.

Step 9. Use a flat head screwdriver as a lever to prise out the battery as shown.



Step 10. To install the new battery:

a. Insert the new battery (CR2032) into the socket with the side labeled “+” facing up, and press the battery into place.

Step 11. Reattach the EMI cover, middle cover, optical drive, computer stand and the rear cover.

## Replacing the system fan

**Note:** Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

**Note:** It may be helpful to place the computer face-down on a soft flat surface for this procedure. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the computer screen from scratches or other damage.

**To replace the system fan**

Step 1. Remove any media (disks, CDs, DVDs or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.

Step 2. Unplug all power cords from electrical outlets.

Step 3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to “Left and right view” and “Rear view” for help with locating the various connectors.

Step 4. Remove the rear cover. Refer to “Removing the rear cover”.

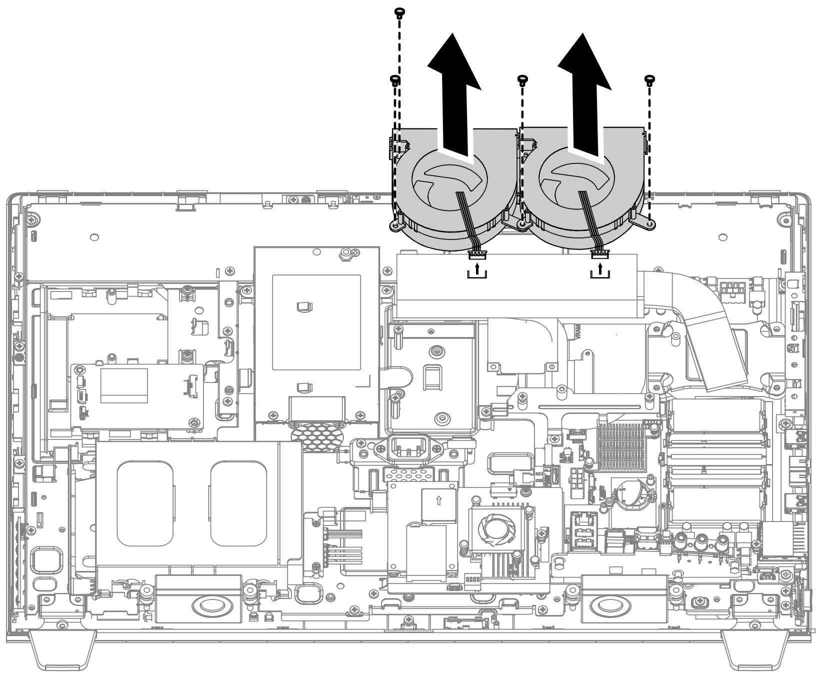
Step 5. Remove the computer stand. Refer to “Removing the computer stand”.

Step 6. Remove the optical drive. Refer to “Replacing the optical drive”.

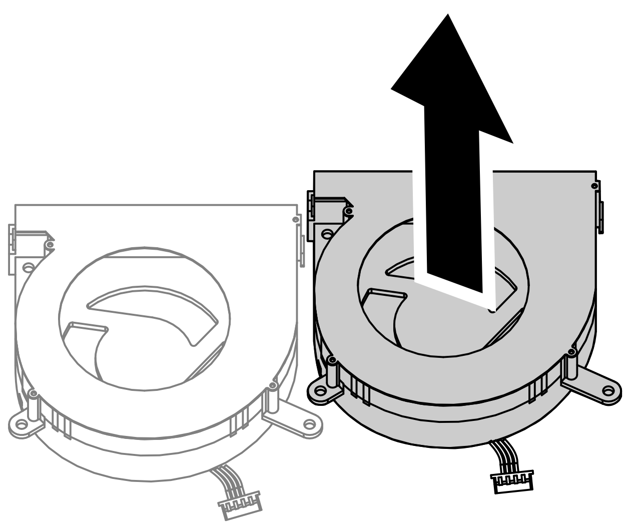
Step 7. Remove the middle cover. Refer to “Removing the middle cover”.

Step 8. Remove the EMI cover. Refer to “Removing the EMI cover”.

Step 9. Remove the 4 screws that secure the system fan to the heat-sink and lift the system fan up to remove it.



Step 10. Separate the defective fan from the good one as shown.



Step 11. Reattach the EMI cover, middle cover, optical drive, computer stand and the rear cover.

## Removing the power supply

**Attention:** Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

**Note:** It may be helpful to place the computer face-down on a soft flat surface for this procedure. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the computer screen from scratches or other damage.

**To remove the power supply:**

Step 1. Remove any media (disks, CDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.

Step 2. Unplug all power cords from electrical outlets.

Step 3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to “Left and right view” and “Rear view” for help with locating the various connectors.

Step 4. Remove the rear cover. Refer to “Removing the rear cover”.

Step 5. Remove the computer stand. Refer to “Removing the computer stand”.

Step 6. Remove the optical drive. Refer to “Replacing the optical drive”.

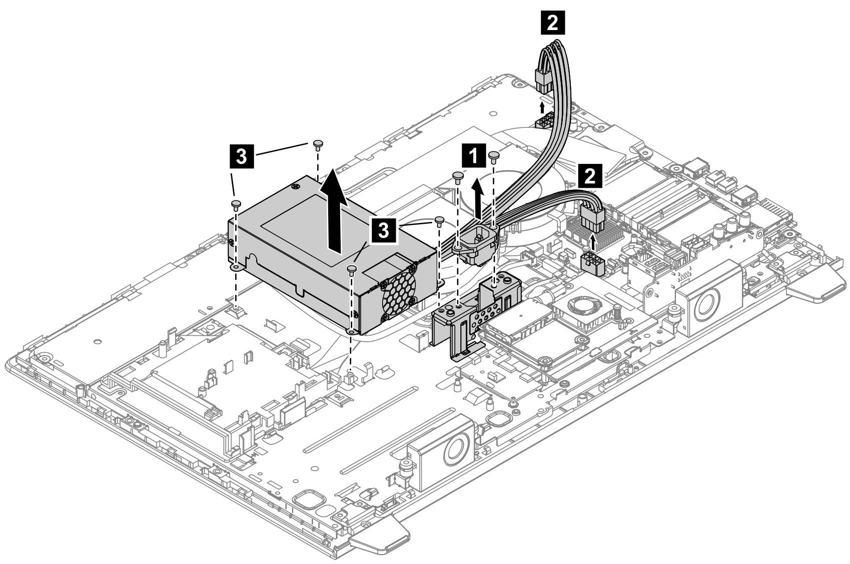
Step 7. Remove the middle cover. Refer to “Removing the middle cover”.

Step 8. Remove the EMI cover. Refer to “Removing the EMI cover”.

Step 9. Remove the 2 screws that secure the power supply connector to the metal bracket. **1**

Step 10. Disconnect the 2 power cables from the motherboard. **2**

Step 11. Remove the 4 screws that secure the power supply to the chassis, and then lift up the power supply as shown. **3**




Step 12. To install the new power supply:

a. Line up the new power supply, secure it to the motherboard using the 6 screws.

b. Connect the power cables to the motherboard.

Step 13. Reattach the EMI cover, middle cover, optical drive, computer stand and the rear cover.

## Replacing the heat-sink

**Note:** Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

**Note:** It may be helpful to place the computer face-down on a soft flat surface for this procedure. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the computer screen from scratches or other damage.

**To replace the heat-sink:**

Step 1. Remove any media (disks, CDs, DVDs or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.

Step 2. Unplug all power cords from electrical outlets.

Step 3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to "Left and right view" and "Rear view" for help with locating the various connectors.

Step 4. Remove the rear cover. Refer to "Removing the rear cover".

Step 5. Remove the computer stand. Refer to "Removing the computer stand".

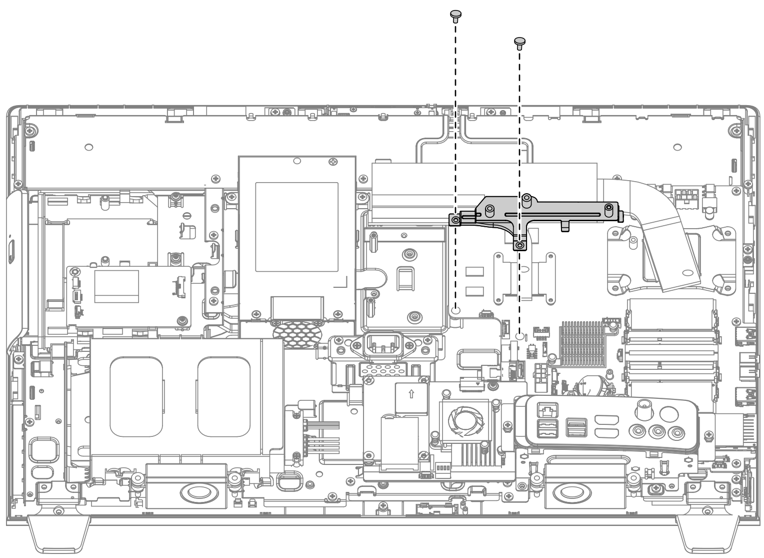
Step 6. Remove the optical drive. Refer to "Replacing the optical drive".

Step 7. Remove the middle cover. Refer to "Removing the middle cover".

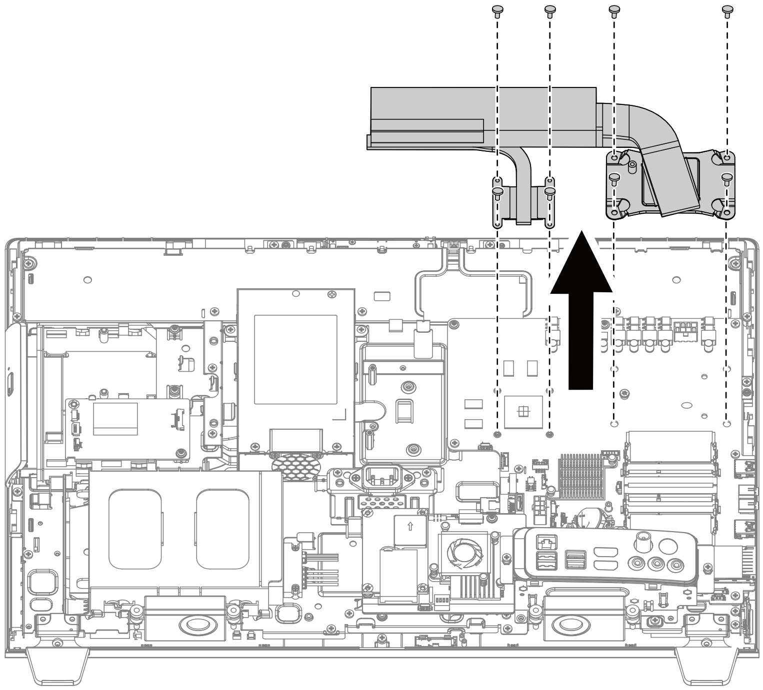
Step 8. Remove the EMI cover. Refer to "Removing the EMI cover".

Step 9. Remove the system fans. Refer to "Replacing the system fans".

Step 10. Remove the 2 screws that secure the system fan supporting bracket and lift up the supporting bracket to remove it.



Step 11. Remove the 8 screws that secure the heat-sink to the motherboard, and detach the cables attached to the heat-sink, then lift up the heat-sink to remove it.



Step 12. To install the new heat-sink:

a. Line up the new heat-sink with mounting holes on motherboard and secure it with the 8 screws.

b. Line up the system fan supporting bracket with the mounting holes on the motherboard and secure it with the 2 screws.

Step 13. Reattach the system fan, EMI cover, middle cover, optical drive, computer stand and the rear cover.

## Replacing the CPU

**Note:** Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

**To replace the CPU**

Step 1. Remove any media (disks, CDs, DVDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.

Step 2. Unplug all power cords from electrical outlets.

Step 3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to "Left and right view" and "Rear view" for help with locating the various connectors.

Step 4. Remove the rear cover. Refer to "Removing the rear cover".

Step 5. Remove the computer stand. Refer to "Removing the computer stand".

Step 6. Remove the optical drive. Refer to "Replacing the optical drive".

Step 7. Remove the middle cover. Refer to "Removing the middle cover".

Step 8. Remove the EMI cover. Refer to "Removing the EMI cover".

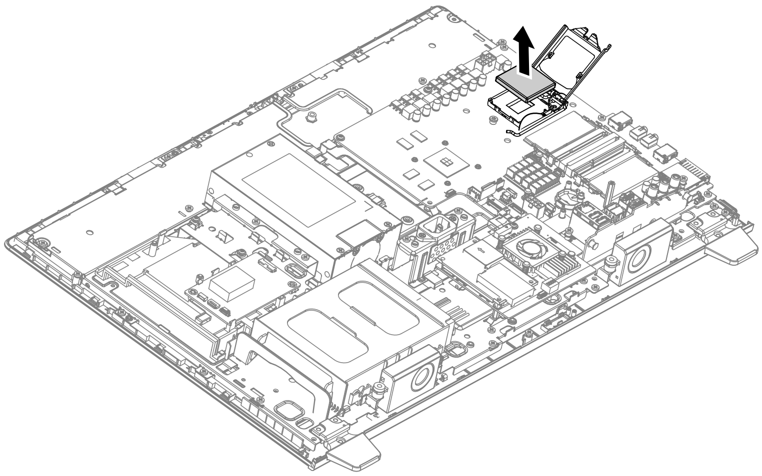
Step 9. Remove the system fans. Refer to "Replacing the system fans".

Step 10. Remove the heat-sink. Refer to "Replacing the heat-sink".

Step 11. Lift the small handle and open the retainer.

> **Attention:** Do not touch the gold contacts on the bottom of the microprocessor. When handing the microprocessor, touch only the sides.

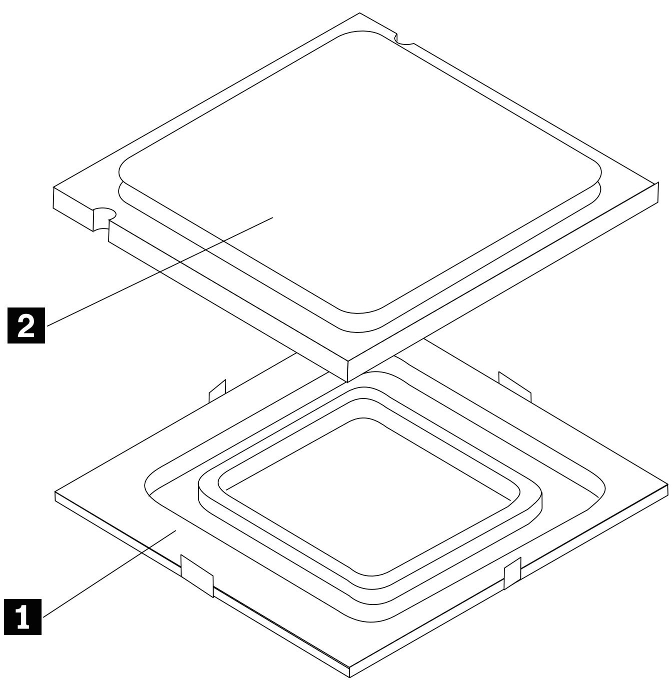
Step 12. Lift the microprocessor straight up and out of the socket.



> **Attention:** Do not touch the gold contacts on the bottom of the microprocessor. When handing the microprocessor, touch only the sides.

> **Note:** Do not drop anything onto the microprocessor socket while it is exposed. The socket pins must be kept as clean as possible.

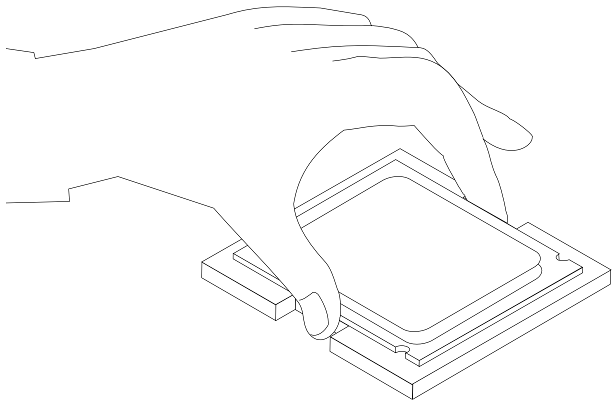
Step 13. Holding the sides of the microprocessor with your fingers, remove the protective cover **1** that protects the gold contacts on the new microprocessor. **2**




Step 14. Holding the sides of the microprocessor with your fingers, position the microprocessor so that the notches on the microprocessor are aligned with the tabs in the microprocessor socket.

> **Important:** To avoid damaging the microprocessor contacts, keep the microprocessor completely level while installing it into the socket.

Step 15. Lower the microprocessor straight down into its socket on the motherboard.



Step 16. To secure the microprocessor in the socket, close the microprocessor retainer and lock it into position with the small handle.

Step 17. Use a thermal grease syringe to place 5 drops of grease on the top of the microprocessor. Each drop of grease should be 0.03ml (3 tick marks on the grease syringe).

Step 18. Reattach the heat-sink, system fan, EMI cover, middle cover, optical drive, computer stand and the rear cover.

## Replacing the rear I/O module

**Note:** Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

**Note:** It may be helpful to place the computer face-down on a soft flat surface for this procedure. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the computer screen from scratches or other damage.

**To replace the rear I/O module:**

Step 1. Remove any media (disks, CDs, DVDs or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.

Step 2. Unplug all power cords from electrical outlets.

Step 3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to “Left and right view” and “Rear view” for help with locating the various connectors.

Step 4. Remove the rear cover. Refer to “Removing the rear cover”.

Step 5. Remove the computer stand. Refer to “Removing the computer stand”.

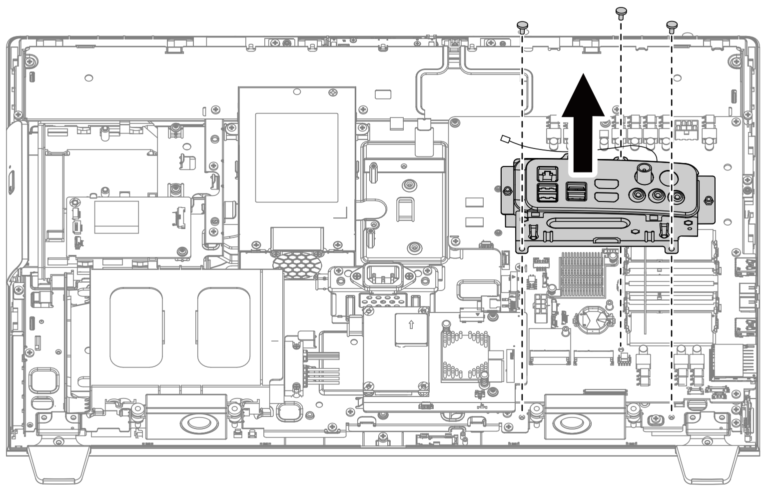
Step 6. Remove the optical drive. Refer to “Replacing the optical drive”.

Step 7. Remove the middle cover. Refer to “Removing the middle cover”.

Step 8. Remove the EMI cover. Refer to “Removing the EMI cover”.

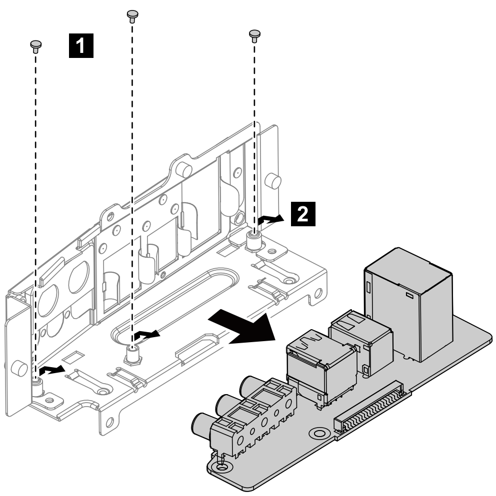
Step 9. Remove the 3 screws that secure the rear I/O module and metal bracket to the chassis.

Step 10. Lift up the rear I/O module.



Step 11. Disconnect the TV antenna cable from the rear I/O module by removing the 2 screws.

Step 12. Remove the 2 screws that secure the rear I/O module to the metal bracket. 1 2




Step 13. Lift the rear I/O module up from connectors on the motherboard then slide it out.

Step 14. To install the new rear I/O module:

a. Line the new I/O module up then slide it into the metal bracket.

b. Secure the new I/O module to the bracket with the 2 screws.

c. Reattach the TV antenna cable to the rear I/O module.

d. Line the new I/O module up with the chassis then secure it with the screws.

Step 15. Reattach the EMI cover, middle cover, optical drive, computer stand and the rear cover.

## Replacing the Wi-Fi card

**Note:** Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

**To replace the Wi-Fi card:**

Step 1. Remove any media (disks, CDs, DVDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.

Step 2. Unplug all power cords from electrical outlets.

Step 3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to “Left and right view” and “Rear view” for help with locating the various connectors.

Step 4. Remove the rear cover. Refer to “Removing the rear cover”.

Step 5. Remove the computer stand. Refer to “Removing the computer stand”.

Step 6. Remove the optical drive. Refer to “Replacing the optical drive”.

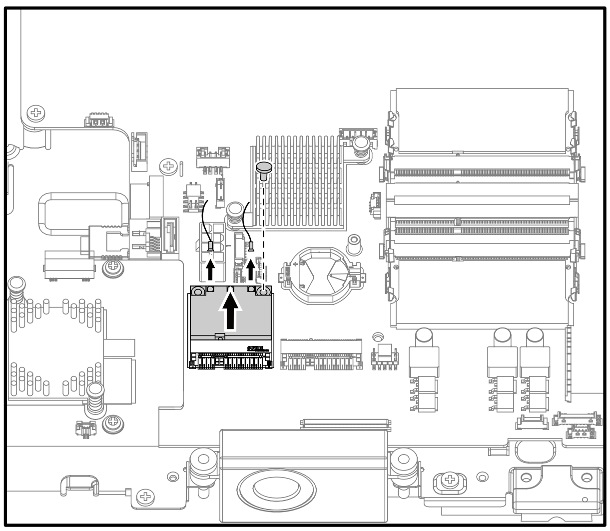
Step 7. Remove the middle cover. Refer to “Removing the middle cover”.

Step 8. Remove the EMI cover. Refer to “Removing the EMI cover”.

Step 9. Remove the screw that secures the Wi-Fi card to the motherboard.

Step 10. Disconnect the antenna cables from the Wi-Fi card.

Step 11. Lift up the Wi-Fi card upward to remove it from the socket.



Step 12. To install the new Wi-Fi card:

a. Insert the new Wi-Fi card to the socket and secure it with the screw.

b. Connect the antenna cables to the new Wi-Fi card.

Step 13. Reattach the EMI cover, middle cover, optical drive, computer stand and the rear cover.

## Replacing the TV tuner card

**Note:** Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

**To replace the TV tuner card**

Step 1. Remove any media (disks, CDs, DVDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.

Step 2. Unplug all power cords from electrical outlets.

Step 3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to “Left and right view” and “Rear view” for help with locating the various connectors.

Step 4. Remove the rear cover. Refer to “Removing the rear cover”.

Step 5. Remove the computer stand. Refer to “Removing the computer stand”.

Step 6. Remove the optical drive. Refer to “Replacing the optical drive”.

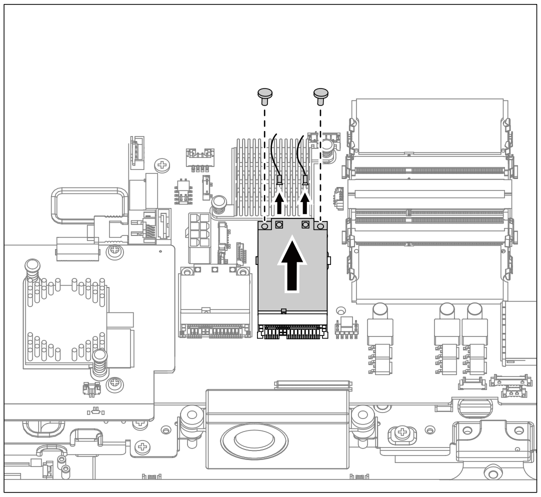
Step 7. Remove the middle cover. Refer to “Removing the middle cover”.

Step 8. Remove the EMI cover. Refer to “Removing the EMI cover”.

Step 9. Remove the screw that secures the TV-Tuner card to the motherboard.

Step 10. Disconnect the antenna cable(s) from the TV-Tuner card.

Step 11. Pull the TV-Tuner card upward to remove it from the card port on the motherboard.



Step 12. To install the new TV-Tuner card:

a. Insert the notched end of the TV-Tuner card into the card port on the motherboard.

b. Secure new TV-Tuner card with the screw to the motherboard.

c. Connect the antenna cable(s) to the new TV-Tuner card.

Step 13. Reattach the EMI cover, middle cover, optical drive, computer stand and the rear cover.

## Replacing the speaker system

**Note:** Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

**To replace the speaker system:**

Step 1. Remove any media (disks, CDs, DVDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.

Step 2. Unplug all power cords from electrical outlets.

Step 3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to “Left and right view” and “Rear view” for help with locating the various connectors.

Step 4. Remove the rear cover. Refer to “Removing the rear cover”.

Step 5. Remove the computer stand. Refer to “Removing the computer stand”.

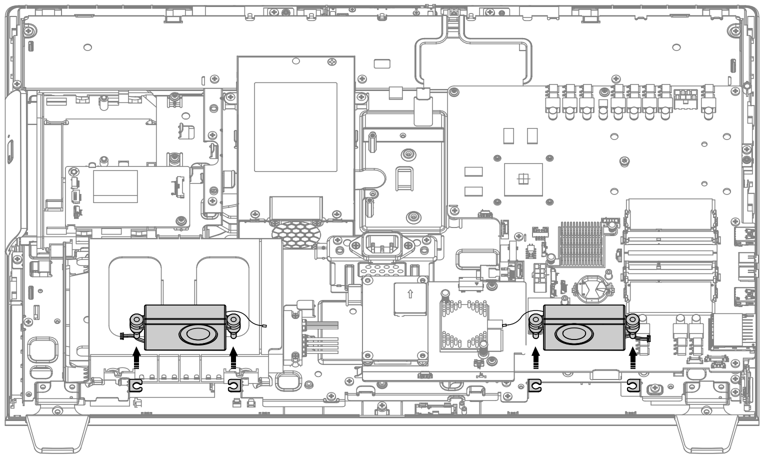
Step 6. Remove the optical drive. Refer to “Replacing the optical drive”.

Step 7. Remove the middle cover. Refer to “Removing the middle cover”.

Step 8. Remove the EMI cover. Refer to “Removing the EMI cover”.

Step 9. Disconnect the speaker cable from the connectors on motherboard.

Step 10. Detach the speaker system from the rubber screws.



Step 11. To install the new speaker system:

a. Secure the new speaker system to the chassis with the rubber screws.

b. Connect the new speaker cable to motherboard.

Step 12. Reattach the EMI cover, middle cover, optical drive, computer stand and the rear cover.

## Replacing the touch control board

**Note:** Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

**To replace the touch control board:**

Step 1. Remove any media (disks, CDs, DVDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.

Step 2. Unplug all power cords from electrical outlets.

Step 3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to “Left and right view” and “Rear view” for help with locating the various connectors.

Step 4. Remove the rear cover. Refer to “Removing the rear cover”.

Step 5. Remove the computer stand. Refer to “Removing the computer stand”.

Step 6. Remove the optical drive. Refer to “Replacing the optical drive”.

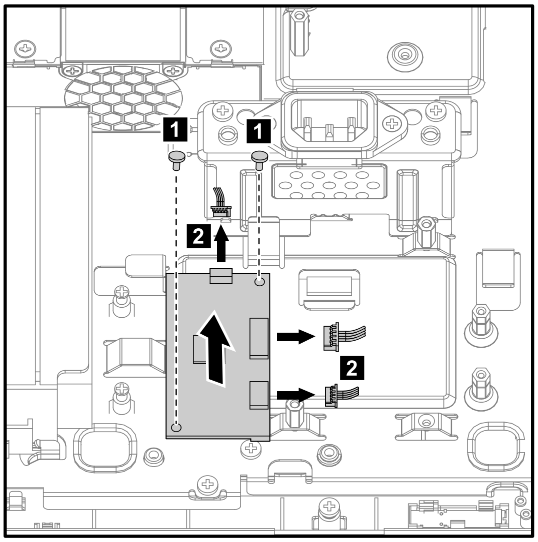
Step 7. Remove the middle cover. Refer to “Removing the middle cover”.

Step 8. Remove the EMI cover. Refer to “Removing the EMI cover”.

Step 9. Disconnect the touch cables from the touch control board.

Step 10. Remove the 2 screws that secure the touch control board to the chassis.

Step 11. Lift up the touch control board to remove it. 1 2




Step 12. To install the new touch control board:

a. Line up the holes on the new touch control board with the mounting holes on the middle frame and secure it with the 2 screws.

b. Connect all the cables to the new touch control board.

Step 13. Reattach the EMI cover, middle cover, optical drive, computer stand and the rear cover.

## Replacing the scalar board

**Note:** Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

**To replace the scalar board**

Step 1. Remove any media (disks, CDs, DVDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.

Step 2. Unplug all power cords from electrical outlets.

Step 3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to “Left and right view” and “Rear view” for help with locating the various connectors.

Step 4. Remove the rear cover. Refer to “Removing the rear cover”.

Step 5. Remove the computer stand. Refer to “Removing the computer stand”.

Step 6. Remove the optical drive. Refer to “Replacing the optical drive”.

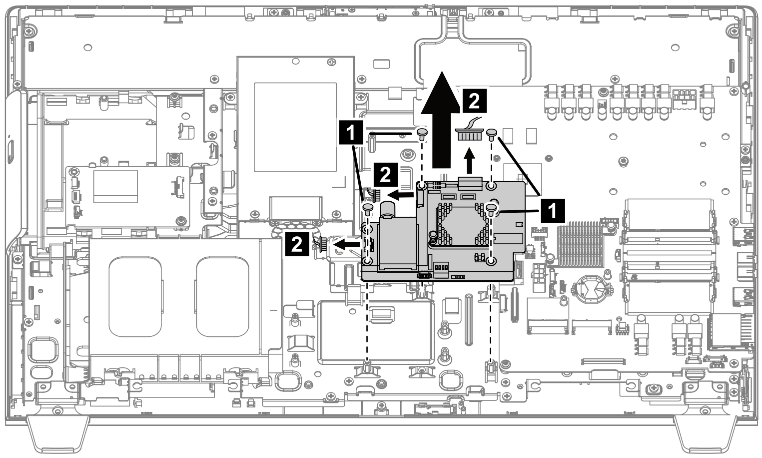
Step 7. Remove the middle cover. Refer to “Removing the middle cover”.

Step 8. Remove the EMI cover. Refer to “Removing the EMI cover”.

Step 9. Remove the rear I/O module. Refer to “Replacing the rear I/O module”.

Step 10. Disconnect the 3 cables from the scalar board.

Step 11. Remove the 4 screws that secure the scalar board to the motherboard and chassis, then lift it up to remove it. 1 2




Step 12. To install the new scalar board:

a. Line up the holes on the new scalar board with the mounting holes and secure it with 4 screws.

b. Connect the cables to the new scalar board.

Step 13. Reattach the rear I/O module, EMI cover, middle cover, optical drive, computer stand and the rear cover.

## Replacing the motherboard

**Note:** Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

**To replace the motherboard:**

Step 1. Remove any media (disks, CDs, DVDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.

Step 2. Unplug all power cords from electrical outlets.

Step 3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to “Left and right view” and “Rear view” for help with locating the various connectors.

Step 4. Remove the rear cover. Refer to “Removing the rear cover”.

Step 5. Remove the computer stand. Refer to “Removing the computer stand”.

Step 6. Remove the memory modules. Refer to “Replacing a memory module”.

Step 7. Remove the optical drive. Refer to “Replacing the optical drive”.

Step 8. Remove the middle cover. Refer to “Removing the middle cover”.

Step 9. Remove the EMI cover. Refer to “Removing the EMI cover”.

Step 10. Remove the system fans. Refer to “Replacing the system fans”.

Step 11. Remove the battery. Refer to “Replacing the battery”.

Step 12. Remove the heat-sink. Refer to “Replacing the heat-sink”.

Step 13. Remove the CPU. Refer to “Replacing the CPU”.

Step 14. Remove the rear I/O module. Refer to “Replacing the rear I/O module”.

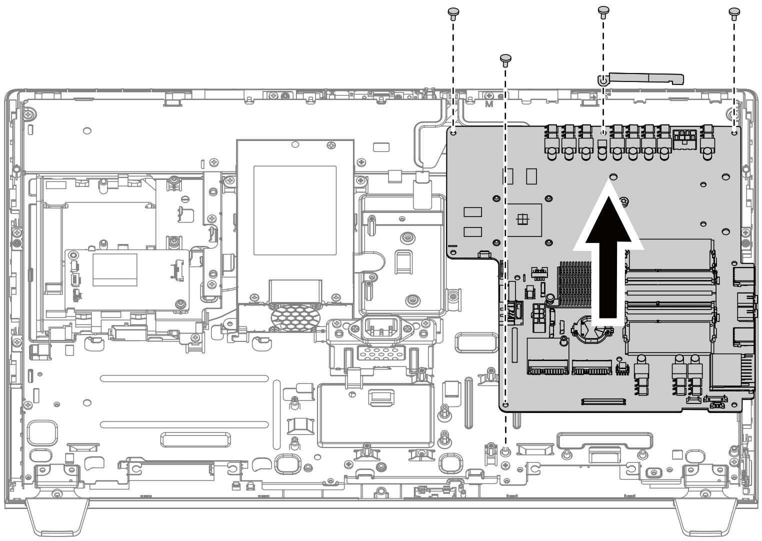
Step 15. Remove the TV scalar board. Refer to “Replacing the TV scalar board”.

Step 16. Remove the Wi-Fi card. Refer to “Replacing the Wi-Fi card”.

Step 17. Remove the TV tuner card. Refer to "Replacing the TV tuner card".

Step 18. Remove all the cables connected to the motherboard.

Step 19. Remove the 4 screws that secure the motherboard to the chassis and slide it out as shown.



Step 20. To install the new motherboard:

a. Line up the motherboard with the chassis, then secure it with the screws.

b. Insert the battery (CR2032) into the socket with the side labeled "+" facing up, and press the battery into place.

c. Insert the notched end of the TV-Tuner card into the card port on the new motherboard and secure it with the screw.

d. Insert the notched end of the Wi-Fi card into the card port on the new motherboard and secure it with the screw.

e. Install the CPU to the new motherboard and secure the CPU in the socket, close the CPU retainer and lock it into position with the small handle.

f. Install the memory module(s) to the new motherboard.

g. Install the heat-sink to the new motherboard.

h. Install the system fans to the new motherboard.

i. Install the TV scalar board to the new motherboard.

j. Install the rear I/O module to the new motherboard.

k. Connect the antenna cable(s) to the TV-Tuner card.

l. Connect all the cables to the new motherboard.

Step 21. Reattach the EMI cover, middle cover, optical drive, computer stand and the rear cover.

## Replacing the LED panel

**Note:** Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

**Note:** It may be helpful to place the computer face-down on a soft flat surface for this procedure. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the computer screen from scratches or other damage.

**To replace the LED panel:**

Step 1. Remove any media (disks, CDs, DVDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.

Step 2. Unplug all power cords from electrical outlets.

Step 3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to “Left and right view” and “Rear view” for help with locating the various connectors.

Step 4. Remove the rear cover. Refer to “Removing the rear cover”.

Step 5. Remove the computer stand. Refer to “Removing the computer stand”.

Step 6. Remove the memory modules. Refer to “Replacing a memory module”.

Step 7. Remove the optical drive. Refer to “Replacing the optical drive”.

Step 8. Remove the middle cover. Refer to “Removing the middle cover”.

Step 9. Remove the EMI cover. Refer to “Removing the EMI cover”.

Step 10. Remove the system fans. Refer to “Replacing the system fans”.

Step 11. Remove the battery. Refer to “Replacing the battery”.

Step 12. Remove the heat-sink. Refer to “Replacing the heat-sink”.

Step 13. Remove the CPU. Refer to “Replacing the CPU”.

Step 14. Remove the rear I/O module. Refer to “Replacing the rear I/O module”.

Step 15. Remove the TV scalar board. Refer to “Replacing the TV scalar board”.

Step 16. Remove the Wi-Fi card. Refer to “Replacing the Wi-Fi card”.

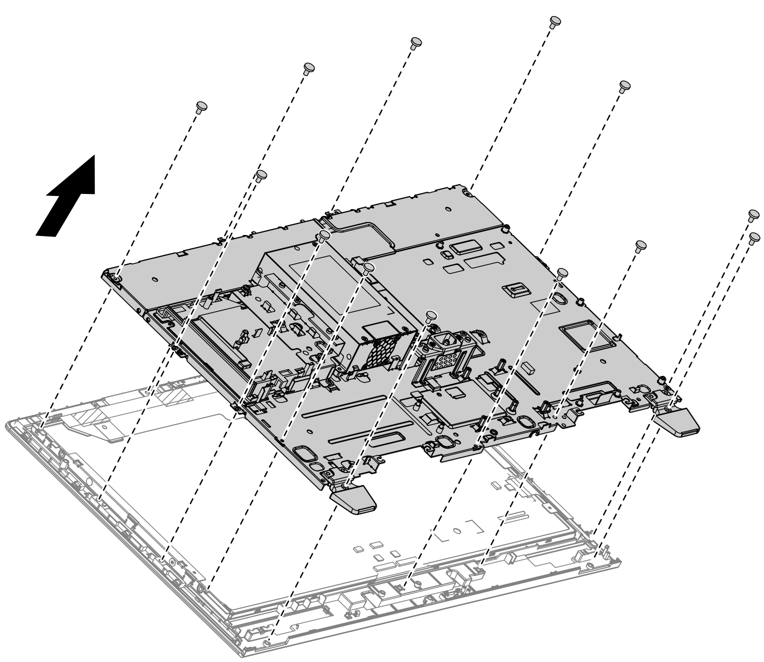
Step 17. Remove the TV tuner card. Refer to “Replacing the TV tuner card”.

Step 18. Remove the camera. Refer to “Replacing the camera”.

Step 19. Remove the motherboard. Refer to “Replacing the motherboard”.

Step 20. Remove the 4 screws secure the LED panel to the chassis.

Step 21. Remove the 9 screws that secure the chassis to the front bezel and lift it up.



Step 22. Disconnect the touch cable from touch control board.

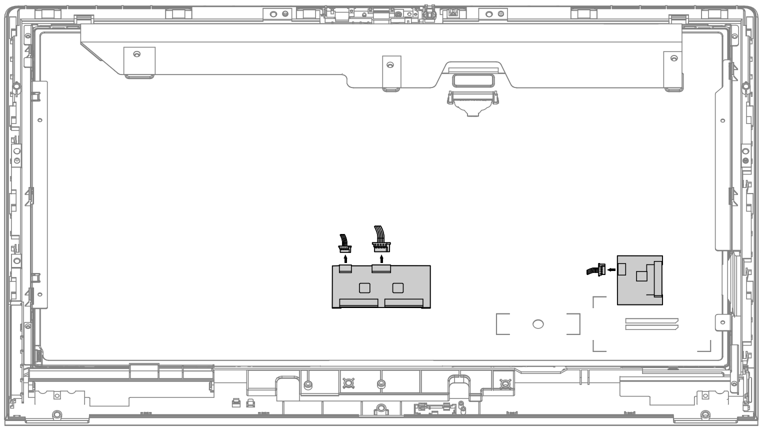
Step 23. Disconnect the converter cable from LED panel.

Step 24. Remove the Wi-Fi antenna from the front bezel.

Step 25. Detach the power board cable, front function board cable, front indicator board cable and LED cable from the chassis.

Step 26. Push the pins out to release the chassis and lift the chassis up and set it aside.

Step 27. Remove the LED cable from the LED panel.



Step 28. Lift up the LED panel and lift it out to remove it.

Step 29. To install the new the LED panel:

a. Connect the LED cable to the LED panel.

b. Line up the chassis with the front bezel and reconnect the power board, front function board, front indicator board and LED cables to the chassis.

c. Reattach the Wi-Fi antenna cables back to the front bezel.

d. Connect the converter cable to the LED panel.

e. Reconnect the touch cable to the touch control board.

f. Secure the new LED panel to the chassis with 4 screws.

g. Secure the chassis to the front bezel with the 9 screws.

h. Reinstall the motherboard, camera, TV-Tuner card, Wi-Fi card, TV scalar board, rear I/O module, CPU, heat-sink, battery, system fans and the memory modules.

i. To get the best display quality for your monitor, adjust the PTV139 DIP switch settings on the TV scalar board according the below chart for different panel models:

| **Note: 1=OFF 0=ON** | | | | | |
|---|---|---|---|---|---|
| Size | Model | DIP 1 | DIP 2 | DIP 3 | DIP 4 |
| 23'LED | LTM230HT10 M01 | 1 | 1 | 1 | 0 |
| | LTM230HT10 M02 | 1 | 1 | 0 | 1 |
| | LM230WF5-TLF1 | 1 | 1 | 0 | 0 |
| | M230HGE-L20 C1 | 1 | 0 | 1 | 1 |
| 23'FPR | LM230WF8-TLA1 | 1 | 0 | 1 | 0 |

Step 30. Reattach the EMI cover, middle cover, optical drive, computer stand and the rear cover.

## Replacing the power switch board

**Note:** Turn off the computer and wait 3 to 5 minutes to let it cool down before removing the cover.

**To replace the power switch board**

Step 1. Remove any media (disks, CDs, DVDs, or memory cards) from the drives, shut down the operating system, and turn off the computer and all attached devices.

Step 2. Unplug all power cords from electrical outlets.

Step 3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to “Left and right view” and “Rear view” for help with locating the various connectors.

Step 4. Remove the rear cover. Refer to “Removing the rear cover”.

Step 5. Remove the computer stand. Refer to “Removing the computer stand”.

Step 6. Remove the memory modules. Refer to “Replacing a memory module”.

Step 7. Remove the optical drive. Refer to “Replacing the optical drive”.

Step 8. Remove the middle cover. Refer to “Removing the middle cover”.

Step 9. Remove the EMI cover. Refer to “Removing the EMI cover”.

Step 10. Remove the system fans. Refer to “Replacing the system fans”.

Step 11. Remove the battery. Refer to “Replacing the battery”.

Step 12. Remove the heat-sink. Refer to “Replacing the heat-sink”.

Step 13. Remove the CPU. Refer to “Replacing the CPU”.

Step 14. Remove the rear I/O module. Refer to “Replacing the rear I/O module”.

Step 15. Remove the TV scalar board. Refer to “Replacing the TV scalar board”.

Step 16. Remove the Wi-Fi card. Refer to “Replacing the Wi-Fi card”.

Step 17. Remove the TV tuner card. Refer to “Replacing the TV tuner card”.

Step 18. Remove the camera. Refer to “Replacing the camera”.

Step 19. Remove the motherboard. Refer to “Replacing the motherboard”.

Step 20. Remove the 9 screws that secure the chassis to the front bezel.

Step 21. Remove the 4 screws secure the LED panel to the chassis.

Step 22. Disconnect the touch cable from touch control board.

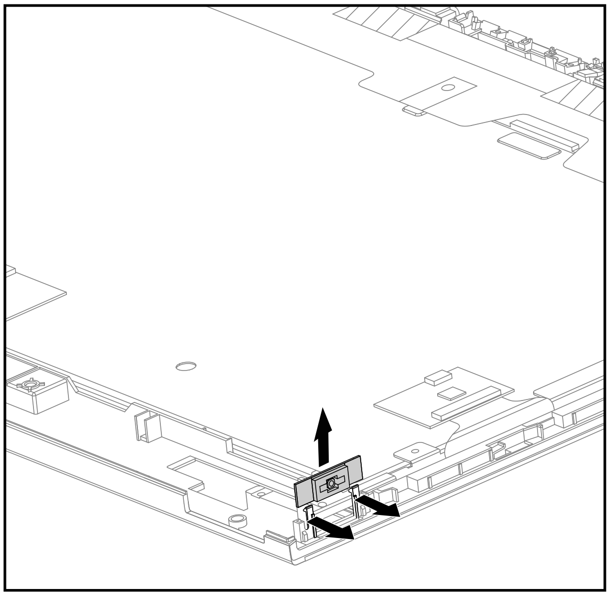
Step 23. Disconnect the converter cable from LED panel.

Step 24. Remove the Wi-Fi antenna from the front bezel.

Step 25. Remove the LED panel. Refer to “Replacing the LED panel”.

Step 26. Push the pins to release the power switch board and pull it out.

Step 27. Disconnect the cable from the power switch board.



Step 28. To install the new the power switch board:

a. Connect the power switch cable to the power switch board.

b. Insert the power switch board, snap it in position and secure it with the pins.

c. Line up the chassis with the front bezel and reconnect the power board, front function board, front indicator board and LED cables to the chassis.

d. Reattach the Wi-Fi antenna cables back to the front bezel.

e. Connect the converter cable to the LED panel.

f. Reconnect the touch cable to the touch control board.

g. Secure the new LED panel to the chassis with 4 screws.

h. Secure the chassis to the front bezel with the 9 screws.

i. Reinstall the motherboard, camera, TV-Tuner card, Wi-Fi card, TV scalar board, rear I/O module, CPU, heat-sink, battery, system fans and the memory modules.

Step 29. Reattach the EMI cover, middle cover, optical drive, computer stand and the rear cover.

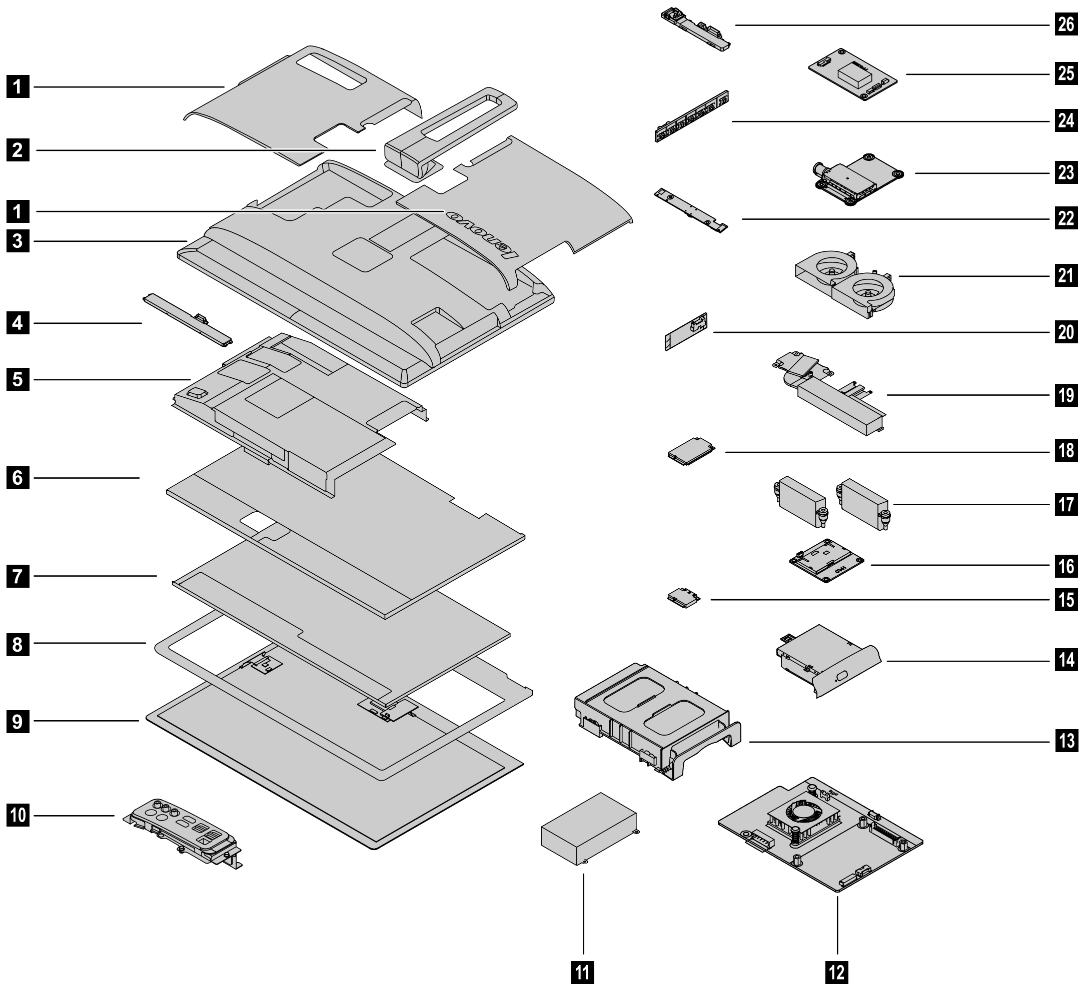
## FRU lists

This chapter lists the information on the field replaceable units (FRUs).

**Attention:** Be sure to read and understand all the safety information before replacing any FRUs.

**Notes:** FRUs that have a 1 or 2 in the CRU column are Customer Replaceable Units (CRUs).

- **1**– identifies parts that are fairly simple to replace, requiring few or no tools.
- **2**– identifies parts that are slightly more difficult to replace.
- **N**-identifies parts that are not to be replaced by the customer.




| Items # | Description | Lenovo P/N | CRU ID |
|---|---|---|---|
| 12 | Processor | | |
| | I I7-3770 3.4/1600/8/1155 77 E1 CPU | 1100335 | N |
| | I I5-3550 3.3/1600/6/1155 77 E1 CPU | 1100337 | N |
| | I I5-3350P 3.1/1600/6/1155 69 E1 CPU | 1100577 | N |
| | I i5-3470 3.2G/1600/6/1155/77 CPU | 1100412 | N |
| | I I5-3450 3.1/1600/6/1155 77 E1 CPU | 1100338 | N |
| | I I5-3330 3.0/1600/6/1155 77 E1 CPU | 1100393 | N |
| | I i5-3550S 3G/1600/6/1155/65 CPU | 1100417 | N |
| | I i5-3470S 2.9G/1600/6/1155/65 CPU | 1100413 | N |

| | | | |
|---|---|---|---|
| | I i5-3450S 2.8G/1600/6/1155/65 CPU | 1100411 | N |
| | I I5-3330S 2.7/1600/6/1155 65 E1 CPU | 1100394 | N |
| | I Ci5-2400S 2.5/1333/6/1155 65 D2 CPU | 1007198 | N |
| | I I5-2320 3.0/1333/6/1155 95 D2 CPU | 1100103 | N |
| | I I3-3240 3.4/1600/3/1155 55 L1 CPU | 1100454 | N |
| | I I3-3220 3.3/1600/3/1155 55 L1 CPU | 1100456 | N |
| | I I3-2130 3.4/1333/3/1155 65 Q0 CPU | 1100102 | N |
| | I SNB Ci3 2120 3.3/3M/1155/65/GT1 Q-0 | 1007388 | N |
| | I G860 3.0/1333/3/1155 65 Q0 CPU | 1100105 | N |
| | I IPP G850 2.9/1333/3/1155/65 Q0 CPU | 1007498 | N |
| | I G645 2.9/1066/3/1155 65 Q0 CPU | 1100578 | N |
| | I G640 2.8/3/1066/1155 65 Q0 CPU | 1100474 | N |
| | I G630 2.7/1066/3/1155 65 Q0 CPU | 1100104 | N |
| | Chipset | | |
| | Intel H61 chipset | 1007535 | N |
| | HWTV | | |
| | yuan HWTV ATV for China | 11200700 | N |
| | yuan HWTV ATV for India | 11200908 | N |
| | RAM | | |
| | M471B5773DH0-CK0 | 1100226 | 1 |
| | HMT325S6CFR8C-PB | 1100227 | 1 |
| | MT8KTF25664HZ-1G6M1 | 1100228 | 1 |
| | Elp_R J2108BDSE-GN-F 2GB D3-1600S | 1100425 | 1 |
| | M471B5273DH0-CK0 | 1100230 | 1 |
| | HMT351S6CFR8C-PB | 1100231 | 1 |
| | MT16KTF51264HZ-1G6M1 | 1100232 | 1 |
| | Elp_R J2108BDSE-GN-F 4GB D3-1600S | 1100426 | 1 |
| | M471B5773DH0-CK0 | 1100226 | 1 |

| | | | |
|---|---|---|---|
| | M471B5273DH0-CK0 | 1100230 | 1 |
| | HMT325S6CFR8C-PB | 1100227 | 1 |
| | HMT351S6CFR8C-PB | 1100231 | 1 |
| | MT8KTF25664HZ-1G6M1 | 1100228 | 1 |
| | MT16KTF51264HZ-1G6M1 | 1100232 | 1 |
| | Elp_R J2108BDSE-GN-F 2GB D3-1600S | 1100425 | 1 |
| | Elp_R J2108BDSE-GN-F 4GB D3-1600S | 1100426 | 1 |
| 13 | HDD | | |
| | Seagate Pharaoh 6G ST3500413AS | 16200064 | 1 |
| | SGT Pharaoh 4K ST500DM002 500G HDD-LH | 16200178 | 1 |
| | WD XL500SM 6G WD5000AAKX-083CA1 | 16200031 | 1 |
| | WD5000AAKX-08ERMA0 | 16200247 | 1 |
| | Seagate Pharaoh 6G ST31000524AS | 16200065 | 1 |
| | SGT Grenada ST1000DM003 1TB HDD-LH | 16200182 | 1 |
| | WD XL500SM 6G WD10EALX-089BA1 | 16200032 | 1 |
| | Hitachi Mariner HDS723020BLA642 | 16005286 | 1 |
| | SGT Grenada ST2000DM001 2TB HDD-LH | 16200184 | 1 |
| | SSD | | |
| | MZMPA064HMDR-000L1 | 16005084 | N |
| | Samsung PM830 64G mSATA SSDMZMPC064HBDR-000L1 | 16200109 | N |
| 14 | ODD | | |
| | SN-208AB | 25201108 | 1 |
| | AD-7740H | 25201106 | 1 |
| | DS-8A8SH | 25201487 | 1 |
| | PLDS DS-6E2SH BDCombo-LH ( BE ) | 25200328 | 1 |
| | HLDS CT30N BD Combo-LH ( BE ) | 25200327 | 1 |
| | HLDS CT40N | 25201493 | 1 |
| | Optiarc BC-5550H Slim Tray BD Combo ODD | 25204159 | 1 |

| | | | |
|---|---|---|---|
| | TSST TS-LB23D BDCombo-LH ( BE ) | 25200329 | 1 |
| | BT20N | 25201634 | 1 |
| | BD-5750H | 25201494 | 1 |
| | GPU | | |
| | N13P-GT (GeForce GT 650M ) | 1100346 | N |
| 11 | PSU | | |
| | ACBEL APB001-EL0G ES5.0 250W PSU(R) | 36200219 | N |
| | FSP FSP250-30SI ES5.0 250W PSU® | 36200220 | N |
| | DELTA DPS-250AB-84A ES5.0 250W PSU® | 36200224 | N |
| | Acbel APA006-EL0G ES5.0 200w PSU® | 36002045 | N |
| | Huntkey HKF2002-32 ES5.0 200W PSU® | 36002046 | N |
| | FSP FSP200-20SI ES5.0 200W PSU® | 36200225 | N |
| 16 | WLAN | | |
| | CBT AR9485 11n SB HMC Wifi card (wow1) | 11200354 | N |
| | LTN RTL8188CE 11n SB HMC Wifi card (wow1) | 11200352 | N |
| 23 | TV Turner | | |
| | MC182A Analog mini® | 11012280 | N |
| | AverMedia H339A5 DVB-T MINI TV CAR | 11200290 | N |
| | AverMedia H339A6 ATSC MINI TV CAR | 11200291 | N |
| | H339 ISDB-T Mini® | 11012854 | N |
| | M270B Mini(R) | 11012147 | N |
| | A360 ISDB-T MINI CARD B-casAvermedia A360 ISDB-T B-cas on Mini TV | 11200109 | N |
| | IC B3 TV label_Japan(C/L)® | 31044061 | N |

| | | | |
|---|---|---|---|
| | B-cas CA card | 11012250 | N |
| | MC163M TV TUNER HYBRID MINICAR | 11011447 | N |
| | Yuan MC163ML DMB-TH Hybrid TV Tuner | 101500189 | N |
| | Avermedia A366 dual ISDB-T TV Card | 11200644 | N |
| | IC B3 TV label_Japan(C/L)® | 31044061 | N |
| | B-cas CA | 11012250 | N |
| | Sony SMT-SJ910PV ISDB-TS TV card | 11200977 | N |
| | IC A7 TV label_Japan(C/L)® | 31044060 | N |
| | B-cas BS/CS CA card | 11012251 | N |
| | A369 ISDB-T TV Tuner MINI CARD( single tuner) | 11012062 | N |
| | IC A7 TV label_Japan(C/L)® | 31044060 | N |
| | B-cas BS/CS CA card | 11012251 | N |
| 15 | TV turner board | | |
| | B540 HWTV Tuner Board for DVB_T + ATV (Europe) | 90000251 | N |
| | B540 HWTV Tuner Board for ATSC(USA) | 90000252 | N |
| | B540 HWTV Tuner Board for ATV (China) | 90000253 | N |
| 19 | Heat Sink | | |
| | B540 COOLERMASTER DIS Heat Sink | 90200876 | N |
| | B540 TAISOL DIS Heat Sink | 90200877 | N |
| | B540 COOLERMASTER UMA Heat Sink | 90200878 | N |
| | B540 TAISOL UMA Heat Sink | 90200879 | N |
| | Other Boards | | |
| 15 | B540 Scalar Board for DVB_T + ATV (Europ) | 90000254 | N |
| | B540 Scalar Board for ATSC(USA) | 90000255 | N |
| 10 | B540 IO Board W/ AV_IN W/USB3.0 | 90000262 | N |
| | B540 IO Board W/O AV_IN W/O HDMI_IN | 90000263 | N |
| | B540 IO Board W/O AV_IN W/USB3.0 | 90000264 | N |
| | B540 IO Board W/ AV_IN W/ HDMI_IN | 90000265 | N |
| | B540 B-Cas Board | 90000267 | N |

| | | | |
|---|---|---|---|
| 4 | B540 Function Status Display Board | 90000269 | N |
| | B540 LED Touch Function Board | 90000268 | N |
| | B540 Power Board | 90000266 | N |
| 18 | Converter | | |
| | B540 Converter for LG | 90000256 | N |
| | B540 Converter for Sumsang | 90000257 | N |
| | B540 Converter for CMI | 90000258 | N |
| | B540 Converter for LG 3D | 90000259 | N |
| 17 | Speaker | | |
| | B540 3W Speaker | 90200887 | N |
| 7 | LCD Module | | |
| | B540 LCD Module For LG W/Touch | 90400021 | N |
| | B540 LCD Module For LG 3D W/Touch | 90400022 | N |
| | B540 LCD Module For Sumsang W/Touch | 90400023 | N |
| | B540 LCD Module For CMI W/Touch | 90400024 | N |
| | B540 LCD Module For LG W/O Touch | 90400025 | N |
| | B540 LCD Module For LG 3D W/O Touch | 90400026 | N |
| | B540 LCD Module For Sumsang W/O Touch | 90400027 | N |
| | B540 LCD Module For CMI W/O Touch | 90400028 | N |
| 21 | Fan | | |
| | B540 FAN 3700RPM HEC Fan | 90200910 | N |
| | B540 FAN 3600RPM HEC Fan | 90200911 | N |
| | Others | | |
| 3 | B540 Middle cover w/o HWTV | 90200891 | N |
| | B540 Middle cover with HWTV | 90200892 | N |
| 2 | B540 Back Stand | 90200893 | N |
| | B540 HDD Bracket | 90200894 | N |
| | B540 ODD Locking Bracket | 90200895 | N |
| | B540 ODD Bezel W/Blue Ray Logo | 90200896 | N |

| | | | |
|---|---|---|---|
| | B540 ODD Bezel W/O Blue Ray Logo | 90200897 | N |
| | B540 Plastic Foot | 90200898 | N |
| 5 | B540 MB EMI Shielding | 90200899 | N |
| 10 | B540Rear IO Board W/1TV_AV_HDMIIN_HDMIOUT | 90200901 | N |
| | B540Rear IO Board W/1TV_HDMIIN_HDMIOUT | 90200902 | N |
| | B540Rear IO Board W/1TV_HDMIOUT | 90200903 | N |
| | B540Rear IO Board W/2TV_HDMIOUT | 90200904 | N |
| | B540Rear IO Board W/2TV_HDMIIN | 90200905 | N |
| | B540Rear IO Board W/HDMIOUT | 90200906 | N |
| | B540Rear IO Board W/HDMIOIN_HDMIOUT | 90200907 | N |
| | B540 Rear I/O Bracket | 90200908 | N |
| | B540 ODD Supporting Bracket | 90200909 | N |
| | B540 FAN Bracket | 90200912 | N |
| | B540 AC bracket | 90200914 | N |
| | B540 ODD housing | 90200915 | N |
| | B540 MainFrame Bracket(inside) | 90200924 | N |
| 1 | B540 Rear cover(right) | 90200933 | N |
| | B540 Rear cover(left) | 90200934 | N |
| 24 | B540 HWTV Function 7 Key Board | 90200940 | N |

# Chapter 9. General information

This chapter provides general information that applies to all machine types supported by this publication.

## Additional Service Information

This chapter provides additional information that the service representative might find helpful.

**Power management**

Power management reduces the power consumption of certain components of the computer such as the system power supply, processor, hard disk drives, and some monitors.

**Advanced configuration and power interface (ACPI) BIOS**

As this computer has an ACPI BIOS system, the operating system is allowed to control the power management features of the computer and the settings for Advanced Power Management (APM) BIOS mode is ignored. Not all operating systems support ACPI BIOS mode.

**Automatic Power-On features**

The Automatic Power-On features within the Power Management menu allow you to enable and disable features that turn on the computer automatically.

- Wake Up on Alarm: You can specify a date and time at which the computer will be turned on automatically. This can be either a single event , a daily event or a weekly event.
- Wake Up on LAN: This feature allows LAN adapter card to wake the System.

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